# SOUTHERN POWER AND INDUSTRY

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NOVEMBER, 1953

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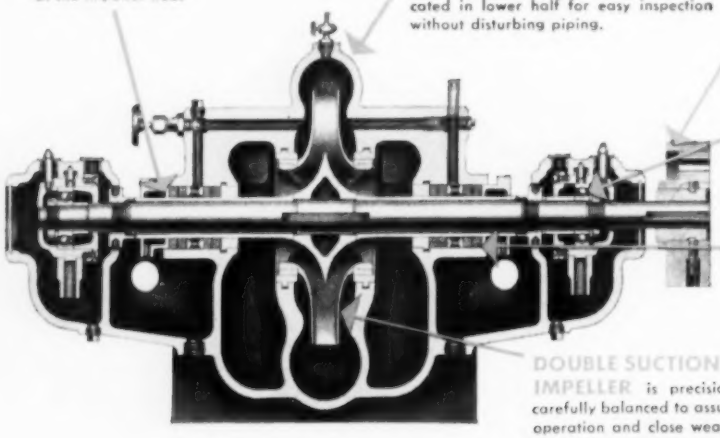
# Look for These 7 Signs of GOOD PUMP DESIGN

**CAST SHAFT SLEEVES,** not commercial tubing, save the shaft from wear. Sleeves extend through the stuffing box and seal at the impeller hub.

**HEAVY HORIZONTAL SPLIT CAST-IRON CASING** construction with suction and discharge nozzles located in lower half for easy inspection without disturbing piping.

**COUPLINGS** have Magic-Grip quick change bushings for pump and drive shaft. Pin and rubber bushing type usually used. Removal for maintenance is easy.



**BALL BEARINGS** may be furnished for either oil or grease lubrication. Sleeve bearings also available in larger sizes.

**GENEROUS STUFFING BOX LENGTH** contains sufficient packing to keep stuffing box maintenance low. Provision is made for sealing water connections or for grease seal if these are required.

**DOUBLE SUCTION ENCLOSED IMPELLER** is precision turned and carefully balanced to assure vibrationless operation and close wearing ring clearance. Water passages are hand finished to a smooth surface.

**STANDARD AND SPECIAL MATERIALS** are available for many types of service where government regulations permit. Iron, bronze, stainless steel and combinations of these materials handle both alkaline and acid solutions. Standard sizes carried in stock range from 10 to 7000 gpm with heads as high as 475 feet.

## ALLIS-CHALMERS Double Suction PUMPS

**THESE DESIGN AND CONSTRUCTION** features of Allis-Chalmers double suction pumps assure long pump life and low maintenance costs. Every A-C double suction pump is carefully tested on the most modern pump testing equipment in the industry.

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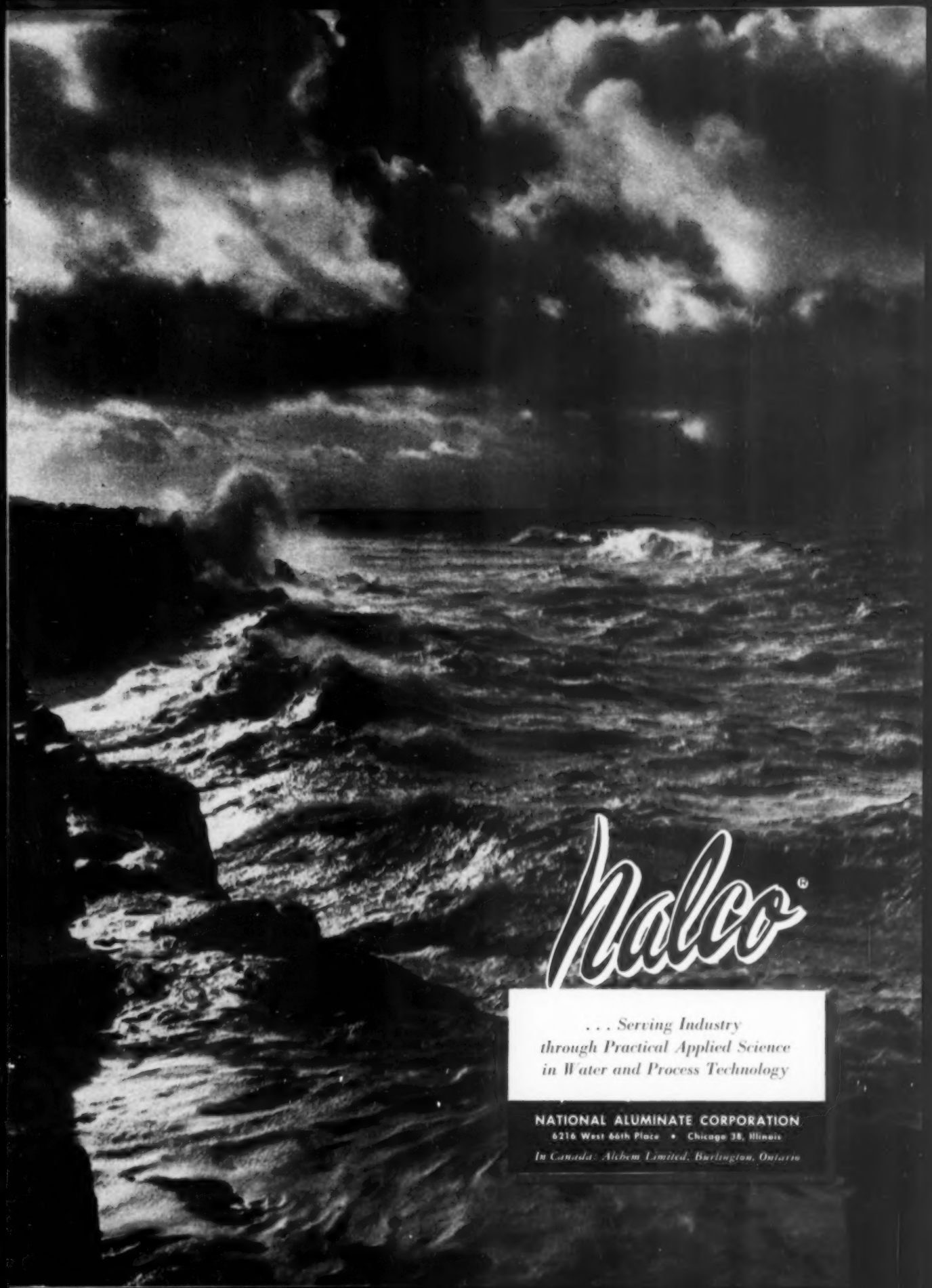
Executive and Editorial Offices: 806 Peachtree St., N.E., Atlanta 5, Ga. Entered as second-class matter at the Post Office, Philadelphia, Pa.
Subscription Rates: United States and Possessions, $1.00 per year or three years for $2.00; Foreign Countries, $10.00 per year.
Volume 71 Number 11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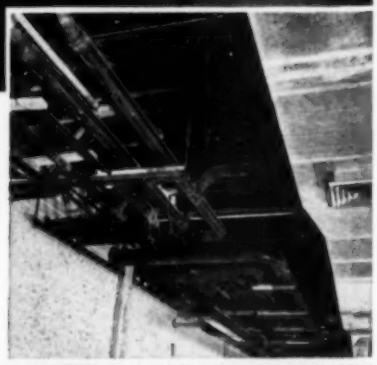

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Schlumberger Well Surveying Corporation, known in the Oil Industry for the slogan, "The Price of a Schlumberger is Negligible Compared to the Loss of an Oil Well" applied the same basic principle to the selection of piping for their new Laboratory and Engineering Building, Houston, Texas. Rightly recognizing that the price of wrought iron pipe is negligible compared to the loss of production utilization caused by pipe failure, and the resulting repairs and replacements, the company used wrought iron in the hot water piping, downspouts and chilled and condenser water lines. Walter Kidde Engineers were consulting and construction engineers; Charles G. Heyne and Company, mechanical contractors.

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**TUBULAR AND HOT ROLLED PRODUCTS**

ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

# SOUTHERN POWER AND INDUSTRY

NOVEMBER 1953

Vol. 71 No. 11



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Annual Subscription—$1.00
Foreign—$10.00

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Published monthly by
W. R. C. SMITH PUB. CO
Atlanta, Ga., and Philadelphia, Pa.

Publishers also of *Textile Industries, Electrical South, Southern Hardware, Southern Automotive Journal, Southern Building Supplies, and Southern Appliances.*

W. J. Rooke, President; R. P. Smith, Executive Vice-President; T. W. McAllister, Vice-President; E. W. O'Brien, Vice-President; A. E. C. Smith, Vice-President.


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Contents indexed regularly by Engineering Index, Inc.

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*Editorial and Executive Offices:* **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA 5, GEORGIA**

# Facts and Trends

## FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

November, 1953

► COMBUSTION CONTROL SYSTEM at Georgia Power Company's newest station--Plant McManus--is of the electronic type. Regulators and positioners in the Republic Flow Meters design are of the standard air operated type, but transmission to and from the control panel is electrical. Semi-technical description of the plant is featured in this issue of SP&I.

Plant is also equipped with permanently installed $CO_2$ fire protective equipment for the 2300 volt and 575 volt cubicles. Equipment is similar to that provided at some of the other new plants on the Southern Co. system, consisting of a number of cylinders piped to the individual switchgear compartments and arranged for simultaneous release from a remote location.

► FLUX RATHER THAN AN ELECTRODE supplies the alloy content of the deposited metal in Lincoln Electric's new automatic hardsurfacing technique. Hardsurfacing can be applied with conventional mild steel electrodes by substituting the new flux for the mild steel flux normally used. By diluting the hardsurfacing flux with mild steel flux, hardsurfacing properties can be matched to service requirements.

► FLAME FAILURE SAFEGUARDS--anti-flooding devices and stack switches had their drawbacks (operated by secondary effects of flame); and flame rods and phototubes their shortcomings (rods awkward to install and phototubes unable to "see" blue, non-luminous gas burner or pilot flame). Modern Fireye flame failure protection and programming in the boiler room of Cabin Crafts,Inc., Dalton, Georgia, was featured in Case Study 31--SP&I's 6th Annual Better Production Issue in October. System utilizes a tiny photoconductive cell that is sensitive only to infra-red radiation given off by a flame.

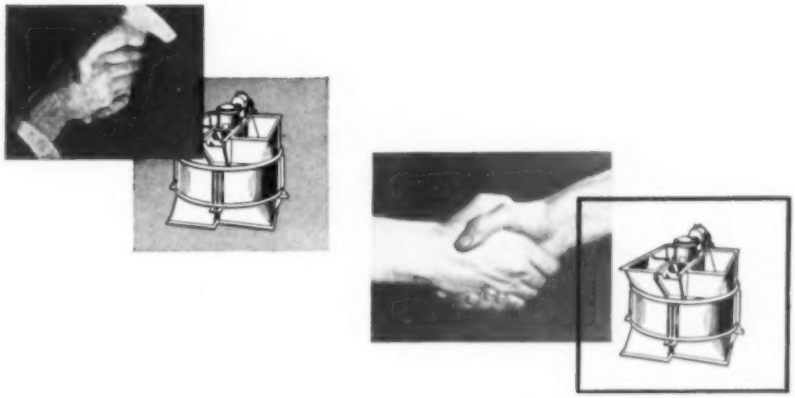
A non-technical explanation of the Fireye system is given in Bulletin C21, available from Combustion Control Corporation, 718 Beacon St., Boston, Mass. Discusses hazards, types of safeguards, and shows you how to make a safety survey of your burners in minutes.

► PROBLEM . . GADGET . . SOLUTION--Mechanical ingenuity is typical of the American worker. From the cotton gin to the can opener he has used his inventiveness to create devices that do things more efficiently, more easily, more safely or at lower cost.

In an effort to further stimulate such ingenuity and to assist in the exchange of ideas of this type, the Petroleum Chemicals Division of E. I. du Pont recently had on tour, two exhibits of gadgets made up by the machine shops of various du Pont plants.

This month's expanded "Helping the Man-in-The-Plant" section of SP&I features several of the gadgets developed by du Pont workers in the South and Southwest. We believe you'll find some of these ideas and devices applicable to your plant's operations.

(Continued on page 6)



# *Why your Ljungstroms are so efficient*

# *—year after year*

Air Preheater Corporation Field Engineers aim to visit every Ljungstrom Air Preheater in this country at least once a year. Their main objective is to increase availability and assure you a maximum return on your investment. They are always available for consultation.

This is just another reason why the Ljungstrom Air Preheater is *the most economical heating surface on the modern boiler.*

## THE AIR PREHEATER CORPORATION

**60 East 42nd Street**
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## facts and trends (continued from page 4)

► HIGH VOLTAGE CABLE--up to 35,000 volts--should permit simple installation, splicing and terminating procedures. Specialized personnel and equipment should not be needed to insure proper operation. In showing how their rubber-insulated cable meets these requirements, The Okonite Company has published a very worthwhile handbook--available at no charge to Southern and Southwestern plant engineering personnel.

The 128 page handbook provides current carrying capacity tables, dimensional data, installation procedures, and detailed drawings for splices and terminals. Write for Bulletin SP-1075 on your letterhead to The Okonite Company, Passaic, New Jersey.

► CONVEYOR BELT CLASSIFIES track materials for re-use, reclamation or scrap at the Roanoke Maintenance of Way Yard at the Norfolk and Western Railway Company.

Crane, equipped with an electro-magnet, lifts track material from railroad cars onto a 24 in. wide belt. Loaded belt passes by a series of 21 bins. At each bin a workman tosses classified material from the belt to the appropriate bin: rail joints, tie plates, rail anchors, switch stands, etc. By the time the material has traversed the length of the conveyor, only unsalvageable scrap is left.

► GOT A TEMPORARY SPACE HEATING PROBLEM? "Guide to the Selection and Use of Portable Space Heaters" is an interesting 38 page booklet describing the advantages and disadvantages of all types. Write American Air Filter Company, Inc., Moline Division, Moline, Illinois, for your free copy.

► INSTRUCTION MEDIUM FOR ELECTRICIANS--check with your local Alcoa sales office on the company's latest film in the "How-To-Do-It" series. Dealing with the techniques of handling and joining for installing aluminum conduit, cable, and wire, "Electrical Wiring With Alcoa Aluminum" features full details on making mechanical, loop joint, compression, and welded joints.

Accompanying the film presentation is a brief, pocket-size folder--a checklist for points explained in the film and a source of information on characteristics of aluminum cable, wire, and conduit.

► MECHANICAL SHAFT SEALS for centrifugal pumps--from design to maintenance --are featured in a new 20 min., full-color film by Byron Jackson. Condensed transcript of film (Bulletin 153-1000) features photographs and drawings. For film showings or bulletins write Pump Division, Byron Jackson Co., Los Angeles 54, Calif.

► THE WOODEN NAIL KEG has gone the way of the cracker barrel. Atlantic Steel Company in Atlanta, Georgia, producer of a full line of Dixisteel nails, has established an industry trend with automatic cleaning units, conveyor system and a fibreboard Nail Caddy. Latter was developed by International Paper Company's Georgetown Laboratory in South Carolina.

Although other steel companies have changed from wooden kegs to similar type fibreboard containers for bulk nail shipments, this is the first time a mill has completely abandoned kegs and made plans to package its full line of nails, rivets, and staples in cartons. Check the "News" section of this issue for additional information on Atlantic Steel's modern production and merchandising methods.

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Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

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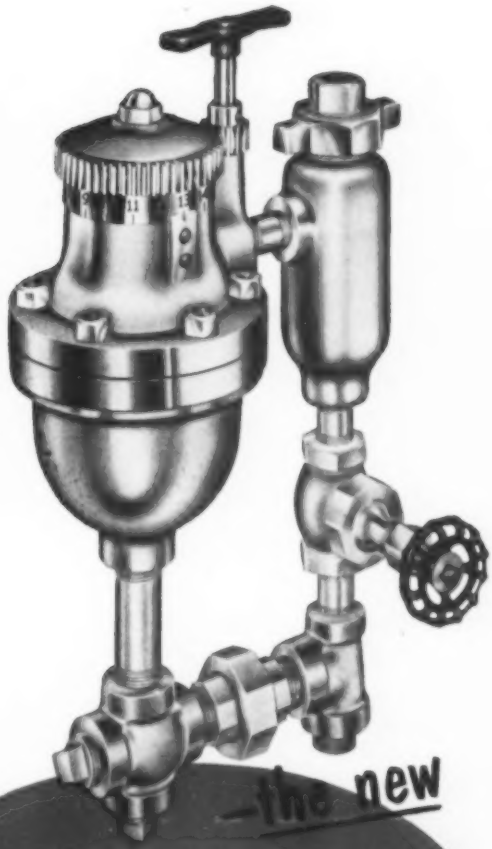
# BIG NEWS

## About Boiler Blow-off



It seems strange that there should still be so much misinformation about such an important subject as boiler blow-off. Yet the facts are these: In many plants boiler blow-off remains a hit-or-miss proposition; too often it's just a choice between inadequate results or unnecessary waste of water and heat units.

Now a new fact has entered the picture. Now every plant can have precise, dollar-saving, continuous control of boiler blow-off, with the new Madden Orifice Meter.

On the one hand the new Madden Orifice Meter assures safe removal of impurities to avoid wet steam or priming. It never forgets, never guesses, never fails—yet can be instantly adapted for changing conditions. It saves expensive heat units wasted by excessive blow-off. Probably no other equipment in the boiler room can so quickly save its own cost.

Operating principles of the new Madden Orifice Meter have been proved in thousands of installations in leading boiler plants over the past 15 years. Suitable for every type and size of boiler and every water condition. Write for new catalog which has all the facts.

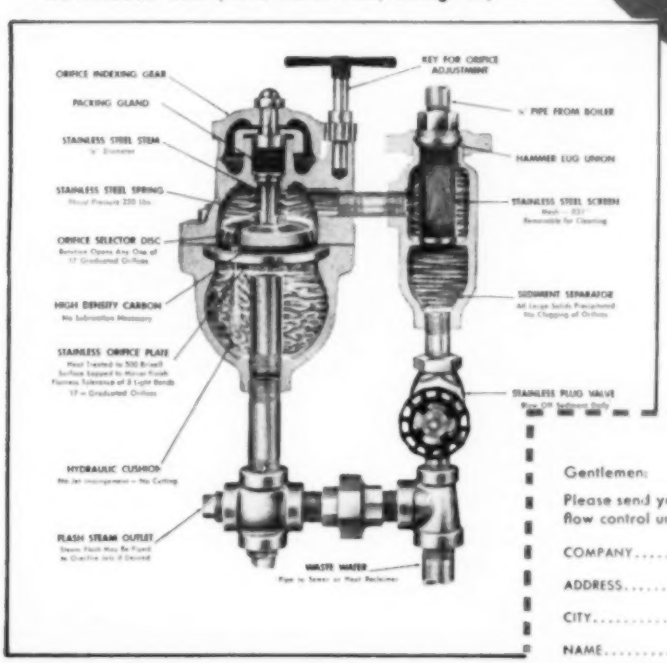
**THE MADDEN CORP., 1543 Morse Ave., Chicago 26, Ill.**

—the new

**MADDEN**

# ORIFICE METER

**FLOW CONTROL UNIT FOR BOILER BLOW-OFF**




- ✔ **Drains from the area of maximum concentration — for maximum effect**
- ✔ **Blows a pin hole stream continuously — to keep in step with the continuous accumulation of impurities**
- ✔ **Controls precisely — choose the correct flow rate for your boiler, 17 orifices sized for your requirements**
- ✔ **Stays accurate — orifices are actually guaranteed against any distortion for 10 years.**

***Get complete engineering data and details of operation —***

**THE MADDEN CORP., 1543 Morse Ave., Chicago 26, Ill.**

Gentlemen:

Please send your new catalog with full facts about the new Madden Orifice Meter flow control unit for boiler blow-off.

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# Equipment . . Supplies . . Methods

## for the plant engineer and operating force

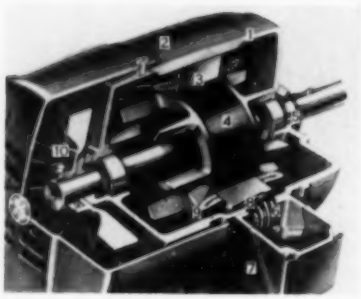
### Polyphase A-C Motor Design Features Many Improvements

K-1 GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y., has announced a new line of polyphase a-c motors (Tri-Clad "55") which offer better protection against the three greatest causes of motor failure — physical damage, electrical breakdown, and operating wear and tear. New line is built in accordance with the revised NEMA frame dimensions.

With an average size reduction of 50% by volume and averaging 22% less weight per horsepower, the "55" retains rigid cast-iron construction and incorporates a new insulation system, bearing assembly, and ventilation plan, according to G-E engineers.

The keystone of the insulation system is a new polyester film which is eight times as strong as previously used materials. It is used to insulate the phases and slot tubes in the stator —the points of hardest motor wear. This synthetic material, combined with Formex wire, an improved Glyptal varnish and silicone Dri-film dip, has withstood accelerated life tests and salt-spray tests better than any other system tried, the engineers said.

The new bearing assembly is more tightly sealed and is lubricated by a grease which lasts at least five times longer than formerly used lubricants. A double-end ventilation system uniformly cools the motor by drawing air in from beneath both endshields, through carefully baffled air passages, and out louvers on the sides of the frame. Larger integrally-cast rotor fans increase the cooling air flow through the motor and dissipate rotor heat more effectively. Protection has been increased by 60% on the drip-proof enclosure through new endshield and frame design.



Cutaway view of the G-E totally-enclosed fan-cooled Tri-Clad "55" motor. Features include: (1) Moisture-proof sealing compound; (2) Completely enclosed by cast-iron; (3) Polyester film slot and phase insulation; (4) Solid cast rotor windings; (5) Labyrinth seal; (6) Permanently-numbered leads; (7) Easy access conduit box; (8) Compression-tight seal; (9) Water-shedding stator windings, and (10) Split-hub Textolite fan.

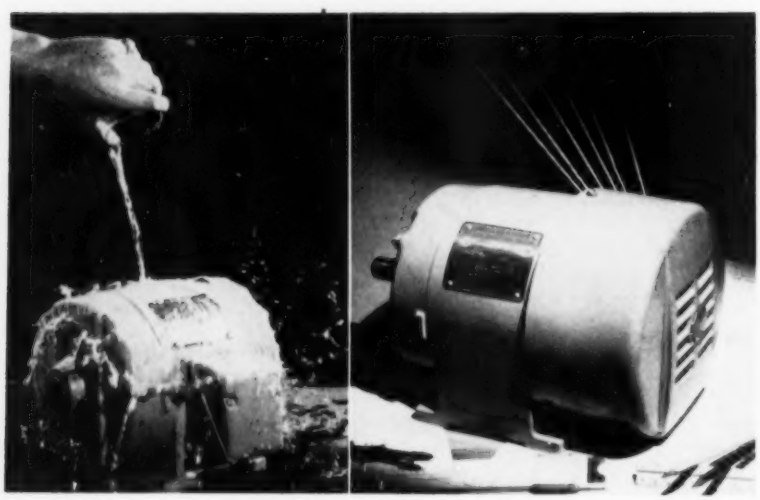
**For more data circle item code number on the postage free post card — p. 17**

A major part of the new motor design involves noise levels. G-E engineers sought the causes of motor noise and found a way to reduce overall sound levels and alter the motor sound to a frequency more pleasing to the human ear. The noise level of the new 10 hp motor tests as low as the former 2 hp model.

The totally-enclosed fan-cooled motor also has been redesigned. Electrical parts are completely enclosed by tightly sealed cast-iron frame and endshields, a compression-fit lead seal, and a rotating labyrinth seal on the shaft.

Besides the longer-life lubricating grease, other improved maintenance features include permanently-numbered, non-wicking connection leads, a larger diagonally-split conduit box, knock-off lugs on the endshields, and location of the combination nameplate-connection diagram directly over the box.

After the first of the year, the new motors will be available in the 182 and 184 frame sizes (1, 1½, and 2 hp at 1800 rpm) in horizontal drip-proof and totally-enclosed fan-cooled models, and a complete line of gear motors. Larger frame sizes will become available at regular intervals. Other types planned for production during 1954 include vertical, single-phase, wound rotor, explosion-proof, multi-speed, face-mounted, and flange-mounted models.



Sixty per cent more protected than former models, General Electric's new drip-proof motor is shown getting a water bath christening. The Tri-Clad "55" is about half as large and as much as 40% lighter per horsepower than its predecessors.

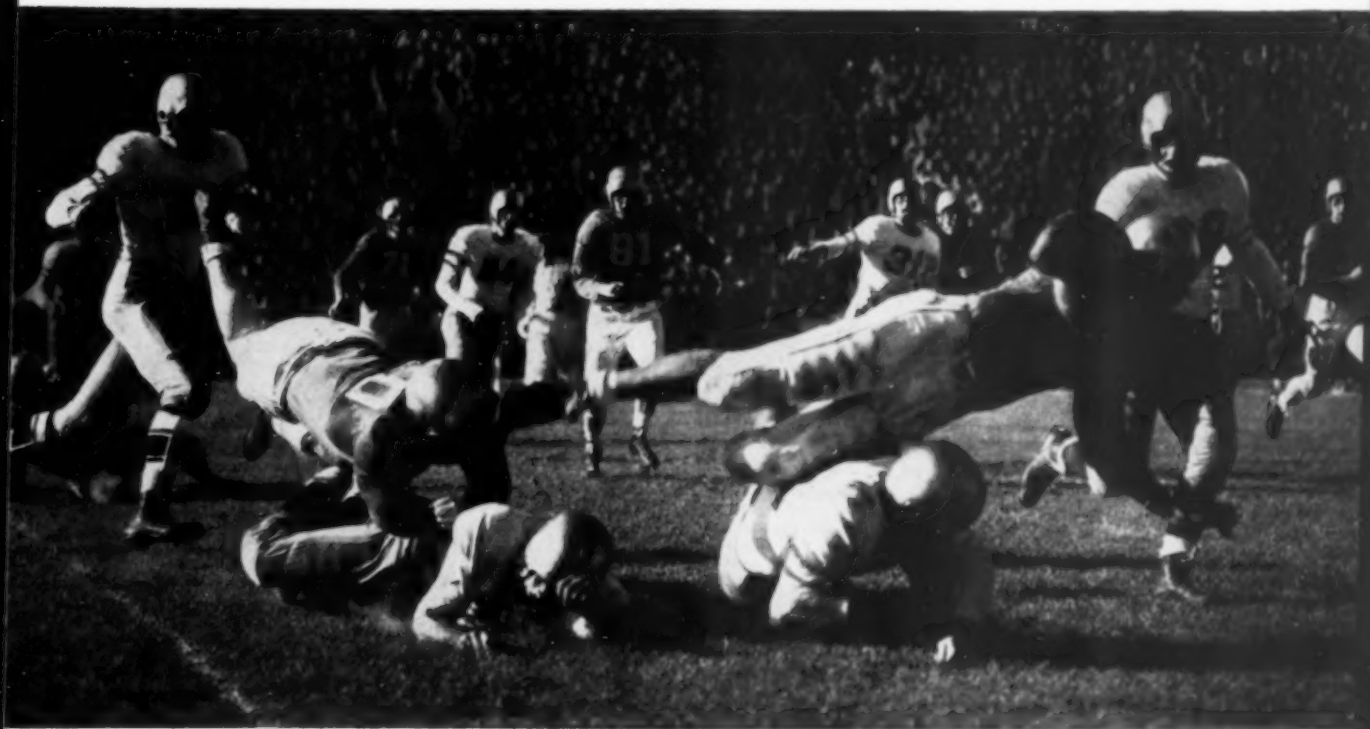
Electrical parts of the TEFC motor are completely enclosed by tightly sealed cast-iron frame and endshields, a compression-fit lead seal, and a rotating labyrinth seal on the shaft. New "jet" ventilation system blankets the frame with cooling air.

# STAR PERFORMERS

From coast to coast, Powell Valves have won enthusiastic approval. For *every* Powell Valve is a *star for outstanding performance*. They have a record of dependability since 1846.

Small wonder that Powell Valves have made such a hit through the years. Powell has probably done more valve research, solved more valve problems and makes more types of valves than any other organization in the world.

We're sure that *you* will be enthusiastic about Powell Valves too once you see how they perform. Following are just a few members of the Powell all-star cast of valves which are available through distributors in principal cities. If a distributor is not located near you, just write us. We'll be pleased to tell you more about these valves—and our complete line.



**INTEGRAL BONNET CAST STEEL "Y" VALVE** *(Fig. 1314-A)* 1500 pound. The one-piece construction eliminates possibility of leakage between body and bonnet. Sizes ½" to 2", inclusive.

**BRONZE "W.S." FULL FLOW GLOBE VALVE** *(Fig. 2608)* for 200 pounds W.P. Regrindable, renewable, hardened stainless steel seat and disc. Nominal pipe size opening through seat permits fuller flow, with pressure drop and turbulence cut to minimum.

**WELDING END CAST STEEL SWING CHECK VALVE** *(Fig. 3061 W.E.)* 300 pounds. Bolted flanged cap. Heavy rugged construction. Available in sizes 1" to 12", inclusive.

**PRESSURE SEAL CAST STEEL GATE VALVE** *(Fig. 11303)* 1500 pound. Many proven advantages and exclusive features. Pressure Seal Non-Return, Check, Globe and Angle valves also available.

DEPENDABLE VALVES SINCE 1846

**Powell Valves**

THE WM. POWELL COMPANY • CINCINNATI 22, OHIO

# Equipment . . Supplies . . Methods

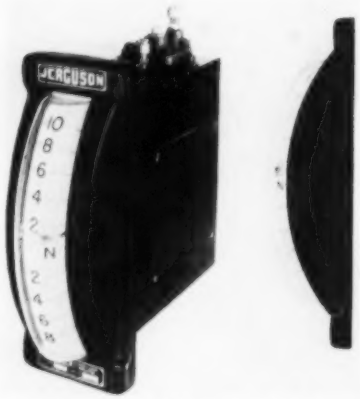
*Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.*

## Convex Scale Reading Gage

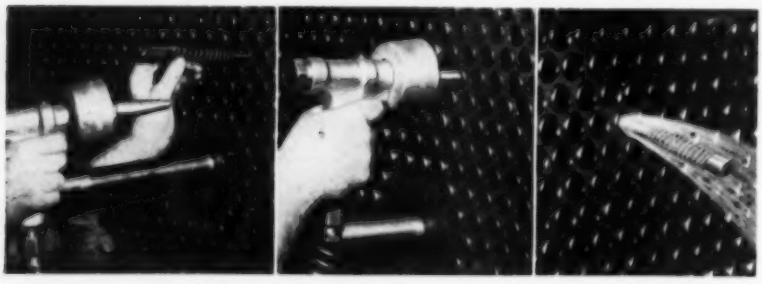
**K-2** JERGUSON GAGE & VALVE Co., 80 Fellsway, Somerville, Massachusetts, announces a new Convex Scale Reading Gage which permits full 180° visibility so it is possible to easily read the liquid level from anywhere in the control room from which the gage cover can be seen.

The new device is designed so that readings of the liquid level can be instantly taken from the front, or either side, without distortion. Scale markings are directly on the convex face. Indicator goes clear around the convex surface. It is possible to stand at one end of a control room and instantly check the whole line-up of gages.

Compensated manometric gage meets the new interpretation of the boiler code for WSP of 900 psi or higher. There are no stuffing boxes. Models are available for any pressure and range.




Side view at the right shows how Jerguson scale markings and indicator go clear around the convex scale surface.



Here's how Elliott Company's condenser tube cleaning "team" operates: Nylon brush is inserted in tube . . gun is pressed into tube which automatically releases water pressure (air may also be used) . . brush, propelled by water flow, emerges from other end of tube with sludge and other soft deposits.

## Condenser Tube Cleaning

**K-3** THE ELLIOTT COMPANY, Lagonda Division, Springfield, Ohio, announces a new condenser tube cleaning "team" consisting of spirally wound nylon brushes and a new, improved aluminum Jiffy Gun.

The spiral design of the nylon brushes gives them a spinning, scouring motion which, together with the flushing action of the water from the gun, quickly removes sludge and other soft deposits from small tubes as in condensers and heat exchangers. The brushes have rubber bumpers or plugs at either end (of slightly smaller dimension than the tube) to permit the water to pass and impart the spinning action to the closer-fitting brush. There is no danger of the brushes sticking in the tubes or injuring the tubes.

In most condensers, it is unnecessary to open the waterbox. Gun can be operated and the brushes recovered at the other end, through handholes.

## Automatic Hardsurfacing With Mild Steel Electrode

**K-4** THE LINCOLN ELECTRIC COMPANY, 22801 St. Clair Ave., Cleveland, Ohio, has developed a new technique for automatic hardsurfacing in which the alloy content of the deposited metal is supplied by an agglomerated granular flux rather than by the electrode.

Any standard automatic welding head or Manual Lincolnweld equipment may be used without any changes; the advantages of hidden arc welding such as uniform feeding and exact arc control are retained. By diluting the hardsurfacing flux with mild steel flux, hardsurfacing properties can be matched exactly to service requirements.

In Lincoln Electric's development, it is possible to apply automatic hardsurfacing with conventional mild steel electrode by substituting for the mild steel flux normally used the new hardsurfacing flux.

The company has marketed two hard-surfacing fluxes. Flux H-545 is to be used whenever a smooth layer of good abrasion resistance and high impact strength is required, such as for deposits to be forged, plow share blanks; metal to metal wear, tractor rollers or crane wheels; or for smooth deposits without porosity and underbead cracking, as in steel mill roughing rolls which do not require machining.

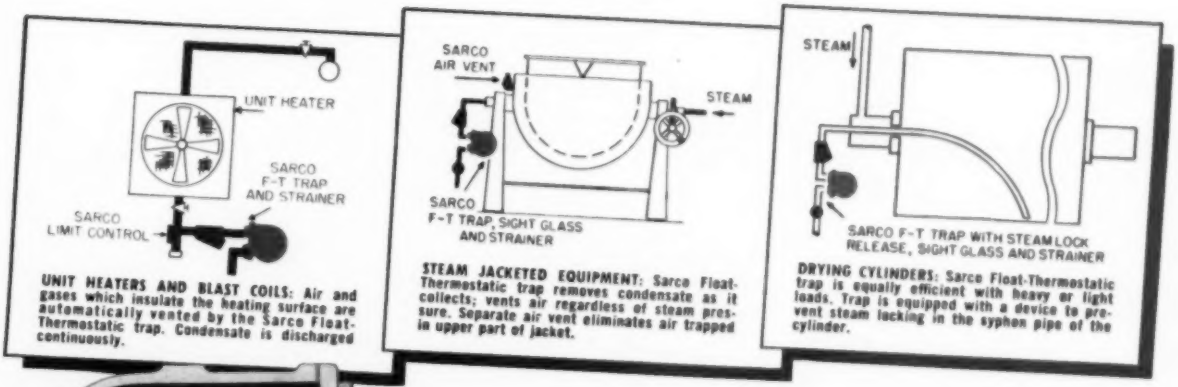
Flux H-550 is used for extremely abrasion resistant deposits with good impact strength, such as crusher rolls, crusher liners, and scraper blades.

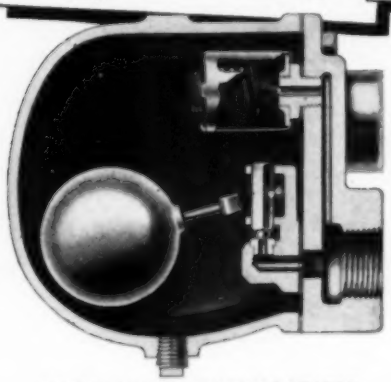
Both of the new hardsurfacing fluxes can be used with a medium to high carbon electrode as well as with a mild steel electrode.

*(Continued on Page 113)*

# Is this your TRAPPING PROBLEM?

*How to get:*
**maximum heat transfer over entire heating surface under varying condensate loads and steam pressures**


UNIT HEATER
SARCO F-T TRAP AND STRAINER
SARCO LIMIT CONTROL
UNIT HEATERS AND BLAST COILS: Air and gases which insulate the heating surface are automatically vented by the Sarco Float-Thermostatic trap. Condensate is discharged continuously.
SARCO AIR VENT
STEAM
SARCO F-T TRAP, SIGHT GLASS AND STRAINER
STEAM JACKETED EQUIPMENT: Sarco Float-Thermostatic trap removes condensate as it collects; vents air regardless of steam pressure. Separate air vent eliminates air trapped in upper part of jacket.
STEAM
SARCO F-T TRAP WITH STEAM LOCK RELEASE, SIGHT GLASS AND STRAINER
DRYING CYLINDERS: Sarco Float-Thermostatic trap is equally efficient with heavy or light loads. Trap is equipped with a device to prevent steam locking in the syphon pipe of the cylinder.



**SARCO FLOAT-THERMOSTATIC STEAM TRAP**

Sizes ¾" to 2½". For complete specifications send for Bulletin 450.

## *How to select the right trap*

There is no universal steam trap. For efficient trapping always match the characteristics of the trap to the requirements of the job.

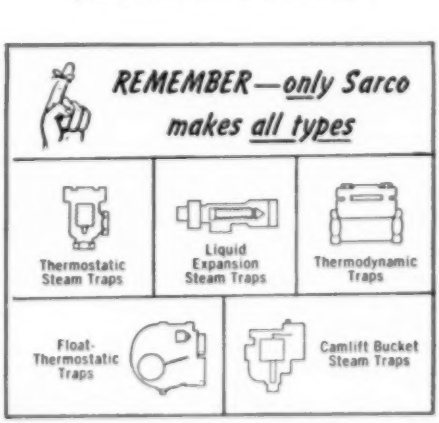
The characteristics of the Sarco Float-Thermostatic trap, for example, are:

1. Discharges condensate continuously at steam temperature.
2. Responds immediately to varying loads and pressures.
3. Automatically vents air on start-up and during operation.
4. Does not cause pressure pulsations which disturb temperature control.

Whatever your trapping needs may be, there's one type trap that will do the job better than any other. Only Sarco makes *all* types – you can always choose a Sarco trap best suited to your job.

**HELPFUL BULLETIN:** "Selecting the Right TYPE Steam Trap" can help you. It gives characteristics of each type of trap and shows which type to use on various installations. Send for Bulletin 145.

**ENGINEERING SERVICE:** You can obtain impartial advice on your trapping problems from Sarco Engineers. Sarco makes *all types* of steam traps – favors no one type. Whenever you need help, call your local Sarco representative.




**SARCO COMPANY, INC.,** Empire State Bldg., New York 1, N. Y.
*Represented in Principal Cities*

**SARCO** *improves product quality and output*

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

any way you look at it...

# Superwashed coals are best

Free-burning, low-ash, low-moisture coal is best for your boilers . . . and high boiler efficiency with low steam cost is best for you. You are sure of the *right* coal for your burning equipment when you order Bell & Zoller's *Superwashed* ORIOLE coal . . . shipped from the No. 11 seam in Western Kentucky via rail or economical combined rail-inland waterway routes.

## BELL & ZOLLER COAL COMPANY

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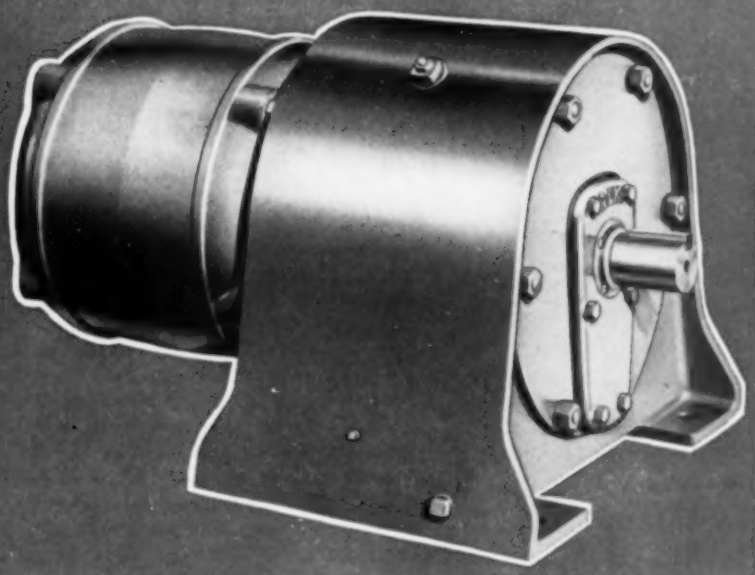
SIXTY-SEVEN YEARS OF SERVICE TO COAL USERS • ST. LOUIS • LOUISVILLE • OMAHA • MINNEAPOLIS • TERRE HAUTE

# Announcing the *–Newly Designed–* Integral

# ALL-STEEL FALK Motoreducer

(Gearmotor Type–Supplementing Falk All-Motor Line)

**. . . with completely standard round-frame, D-flange motor**



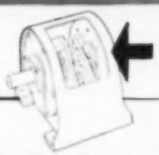
## Check and Compare these features...

Meet a faithful old friend in a new, modern dress! The famous, time-proved Integral Type *all-steel* Falk Motoreducer (Supplementing Falk All-Motor Line) has been redesigned into a compact, streamlined unit providing the utmost in space economy—but retaining all the application versatility, long-life performance, easy-maintenance features and superior structural qualities that have made Falk Motoreducers the recognized standard throughout industry.

In this new Integral unit—rated in accordance with AGMA standards—a *completely standard* round-frame, D flange NEMA motor is mounted directly on the all-steel Motoreducer housing. The motor remains a separate piece of equipment, readily replaceable with any other type or make. Output speed (ratio) can be changed within unit's torque capacity without modifying motor. Size and arrangement of the standard housing permit wide ratio range—from 3.36:1 to 542:1.

In order to meet the greatest number of industrial application needs, the newly designed Integral Motoreducers are available in horizontal and vertical models, both in concentric and right-angle types; double, triple and quadruple reduction; horsepower range, 1 to 40 HP. Prompt stock shipment in standard ratios is offered.

Whatever your reduction requirements, you get greatest dollar-for-dollar value in the long run by standardizing on Falk products. Write for Bulletin 3104.



**Every FALK Motoreducer has these "In-built" Factors—**

**Precision Gearing.** Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

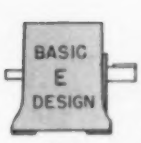
**All-steel Housings.** Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

**Streamlined inside and outside.** Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

**Positive Lubrication.** Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

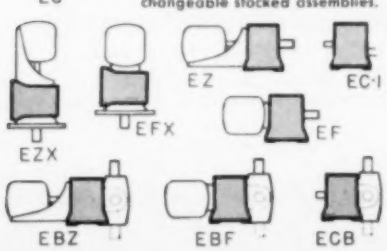
**Wide Speed Range.** Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

**Sealed Housings.** Dual closures and one-way vents keep oil *in*, dust and moisture *out*. Units are splash-proof, leakproof, dustproof.




EC

The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.




# FALK ...a good name in industry

**THE FALK CORPORATION · 3001 W. Canal St. · Milwaukee 8, Wis.**

**WRITE FOR BULLETIN 3104**

# new

# WIDER VISION

## for easier remote boiler water level readings

Yarway Remote Water Level Indicator is of the manometric type with automatic temperature compensation. Note new "wide vision" face See Yarway Bulletin WG-1823.

■ Vastly improved visibility of remote boiler water level readings can now be enjoyed by boiler plant operators.

The new "wide vision" face on Yarway Remote Liquid Level Indicators allows reading from the side as well as the front of the indicator.

Boiler water levels and other liquid levels can be checked from most any position in the control room or wherever the Yarway Indicator is installed.

Indicating mechanism is operated by the boiler water level itself, assuring instant, accurate readings. Indicating mechanism is never under pressure. There are no stuffing boxes.

Over 10,000 Yarway Remote Liquid Level Indicators are successfully used throughout industry—primarily for indicating boiler water levels, but also other liquid level applications, and for super-heater pressure differential indication aboard ship.

APPROVED MANOMETRIC TYPE

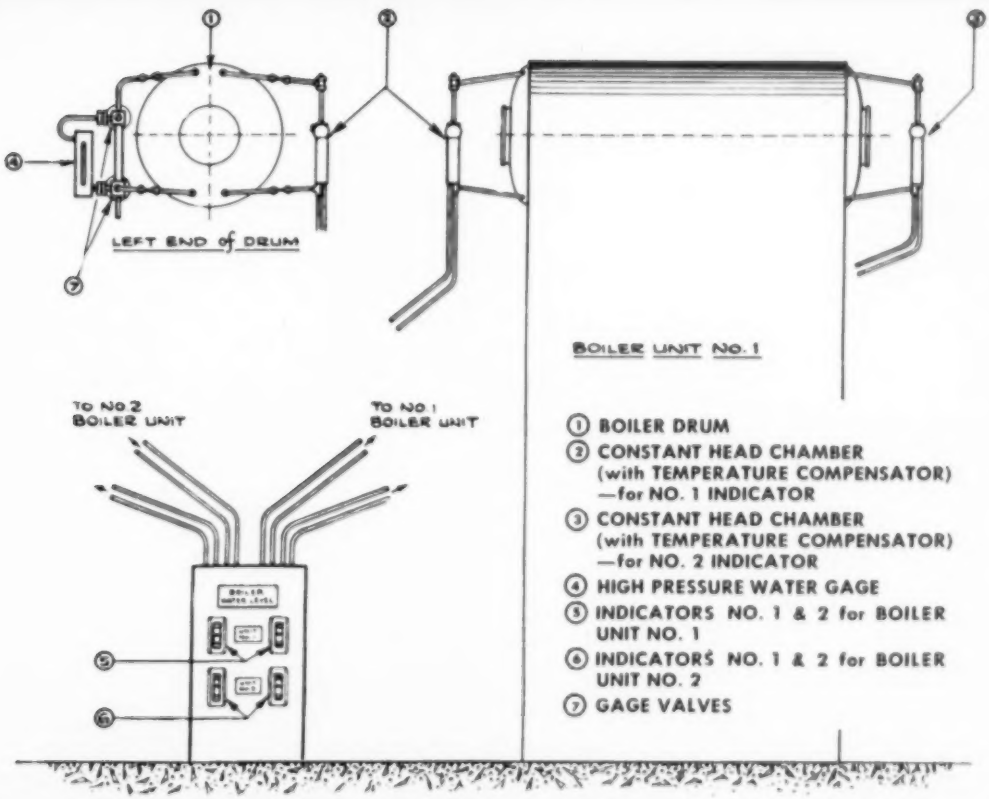
Yarway Remote Liquid Level Indicators are of the manometric type, with automatic temperature compensation, as approved for use under the new ruling of the A.S.M.E. Boiler Code Committee as covered in Code Case #1155, which permits the use of two remote indicators in place of one of the high pressure boiler water gages on boilers over 900 psi.

Additional information—write

**YARNALL-WARING COMPANY**
*Home Office:* 116 Mermaid Ave., Phila. 18, Pa.

*Southern Representative:*
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

**Suggested installation of Yarway Remote Liquid Level Indicators and High Pressure Water Gages as now permitted by the A.S.M.E. Boiler Code.**


LEFT END of DRUM
BOILER UNIT NO. 1
TO NO 2 BOILER UNIT
TO NO 1 BOILER UNIT
① BOILER DRUM
② CONSTANT HEAD CHAMBER (with TEMPERATURE COMPENSATOR) —for NO. 1 INDICATOR
③ CONSTANT HEAD CHAMBER (with TEMPERATURE COMPENSATOR) —for NO. 2 INDICATOR
④ HIGH PRESSURE WATER GAGE
⑤ INDICATORS NO. 1 & 2 for BOILER UNIT NO. 1
⑥ INDICATORS NO. 1 & 2 for BOILER UNIT NO. 2
⑦ GAGE VALVES

**YARWAY® remote liquid level indicators**

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## And How to Do It

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Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on pages 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

### STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

**1** **STACKS, FANS, DUST COLLECTORS FOR POWER AND INDUSTRIAL PLANTS**—Catalog 200—Application data and illustrative views of Thermix fan-stacks, fans, tubular and duplex dust and soot collectors, multiclones, and recirculators for flue gas control.—PRAT-DANIEL CORPORATION and THERMIX ENGINEERING COMPANY.

**8** **CHIMNEYS, ARCHITECTURAL AND INDUSTRIAL**—Pamphlet describes architectural and industrial chimneys in radial brick and reinforced concrete for all types of service—and a nation-wide maintenance service readily available for the repair, inspection, modification and dismantling of all types of chimneys.—CUSTODIS CONSTRUCTION COMPANY, INC.

**14** **FUEL OIL PUMPING AND HEATING SYSTEMS** — Bulletin OB-37 — Describes and gives specifications and illustrations of various equipment units to handle all grades of fuel oil as required by every type of oil burner.—THE ENGINEER CO.

**22** **SPREADER STOKER** — Bulletin 800, 16 pages—Illustrates and describes RotoStoker Type C-C, a relatively small spreader stoker for boilers and steam generators from approximately 5,000 to 75,000 lb per hr steam output.—DETROIT STOKER COMPANY.

**25** **DOUBLE-PASS BOILERS** — Bulletin 153—Gives complete specifications of a new double pass all-purpose industrial and heating boiler, "Southern made for Southern trade." Sizes from 44 to 153 hp S.B.I. with pressure up to 150 lb, designed for coal, gas or oil firing. This is a complete package double-pass unit, recently added to a regular line of single-pass firebox boilers manufactured since 1918.—LUCEY BOILER & MANUFACTURING CORP.

**29** **CONTINUOUS BLOW-OFF**—Bulletin, 8 pages—Gives the basic facts about boiler blow-off, and describes the Madden system of control of continuous blow-off for the removal of solids and impurities from steam releasing surfaces.—THE MADDEN CORPORATION.

**33** **SOOT BLOWER HEADS**—Bulletin 1006-A—Describes the power-driven Vulcomatic E-4 rotary soot blower head, giving maximum blowing pressure through full blowing arc and other advantages. Illustrations show how easily equipment is maintained.—VULCAN SOOT BLOWER DIVISION.

**48** **BOILER TUBES**—Booklet, available upon request, gives details concerning weights and other data of tubing and pipe, their working pressure scales, and the bending operations used in forming. Useful charts and engineering information.—BOILER TUBE CO. OF AMERICA.

**51** **WATER-TUBE STEAM GENERATOR**—Booklet "Type A," 8 pages—Gives data and specifications for complete factory assembled steam generator units in nine sizes, from 5300 to 33,000 lb per hr, for pressures up to 400 psi, designed to provide fully automatic firing with oil, gas or stoker-fired coal.—SUPERIOR COMBUSTION INDUSTRIES, INC.

**76** **GAS BURNER** — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing—in a horizontal plane through fire doors or small openings over handfired coal grates or stokers—or for firing in a vertical plane on either side of stoker or oil burner.—THE WEBSTER ENGINEERING COMPANY.

**77** **OIL BURNERS**—Condensed Catalog, 16 pages—Describes oil and combination gas-oil burners, including fully automatic, semi-automatic, and manually controlled horizontal, rotary and steam turbine driven burners—specifications and capacities. —RAY OIL BURNER COMPANY.

**85** **COAL ANALYSES**—Literature and data sheets—give complete analyses of available coals and individual analyses of different types of coal.—BELL & ZOLLER COAL CO.

**91** **ELECTRICAL PRECIPITATORS FOR COLLECTION OF SOLID AND LIQUID MATTER**—Booklet—Describes the various types and applications of Cottrell and electrical precipitators for the collection of solid and liquid matter suspended in hot or cold gases giving complete engineering data and installation illustrations.—WESTERN PRECIPITATION CORP.

**93** **SMALL BOILERS, SCOTCH AND PORTABLE**—Bulletin 236, 32 pages, —describes a complete line of self-contained, portable, Scotch type boilers, especially designed for particular applications—low space requirements, easily installed, rapid steamers, safe and economical. Stokers, burners and allied equipment. — THE JAMES LEFFEL & CO.

### FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

**102** **SCREW PUMPS**—Bulletin SE-5, 6 pages—Describes new external gear and bearing bracket type screw pumps, for pumping non-lubricating fluids, semi-fluids, fuel oils, crude oils, acetates, distillates, chemicals and water. Illustrated. Table of dimensions.—SIER-BATH GEAR & PUMP COMPANY, INC.

**104** **HEAT EXCHANGERS** — Bulletin FF-FD-0.001, 12 pages—Describes Fin-Fan heat exchangers, air cooled units designed for a wide variety of industrial cooling and condensing applications—to replace or augment water-cooled heat exchangers.—THE FLUOR CORPORATION.

**106** **BLOWERS AND FANS**—Bulletin 12-R-53 — Describes Montgomery Blo-Rite fans and centrifugal blowers, particularly intended for material handling. These are extra heavy, high efficiency fans and blowers to handle the most difficult jobs of air and materials movement.—JACKSONVILLE BLOW PIPE CO.

**157** **SEWAGE PUMPS** — Bulletin 7600, 4 pages—Illustrates and describes vertical sewage pumps, float controls, alarms and starters, specifications and tables of approximate dimensions included, with line drawings and equipment photographs.—THE DEMING COMPANY.

**169** **FORCED DRAFT FANS** — Bulletin 300, 8 pages—Describes features of the Prat-Daniel forced draft fans of new design, explaining the split-wheel design for four way diffusion.—THE THERMIX CORP.

**173** **CENTRIFUGAL PUMPS, END SUCTION** — Bulletin B-2300 — Describes a complete line of end suction centrifugal pumps, ¼ hp to 150 hp size. Face-mounted and flexible-coupled drives. Dimensions and complete engineering descriptive data.—PEERLESS PUMP DIVISION.

### INSTRUMENTS—METERS CONTROLS—REGULATORS

**202** **ORIFICE FLOW METERS**—Bulletin, 8 pages — Describes orifice meters used for the control of continuous blow-off of boilers, and of similar solids removal from steam and gas releasing surfaces, available in pressures up to 650 psi.—THE MADDEN CORPORATION.

**215** **TEMPERATURE REGULATOR**—Catalog 550—Describes Sarco temperature regulator to keep heating coils and heaters at correct temperature—inexpensive. —SARCO CO., INC.

**241** **REMOTE FEEDWATER CONTROL** —Bulletin 1008—Illustrates and describes Copes Type P regulator for remote boiler feedwater control. Covers single element and double element Flowmatic types.—COPES-VULCAN DIVISION, Continental Foundry & Machine Co.

**243** **MULTI-POINTER GAGES**—Bulletin 163-B describes the latest developments in Bailey diaphragm-operated multi-pointer gages for measurement of pressure, draft or differential. Describes four casing styles available in sizes to accommodate from one to twelve units.—BAILEY METER CO.

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**257** **AUTOMATIC STEAM PRESSURE CONTROL**—Bulletin 462—Describes the Leslie pressure controller for supplying intermittent make-up to a low pressure system from a high pressure line—positive, faithful.—LESLIE COMPANY.

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**269** **CONTROL VALVES AND TRAPS**—Bulletin 552 — Describes control valves and steam traps for particular application in the heating, compressing and operating of molding presses in plastic molding. —W. H. NICHOLSON & CO.

### PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

**314** **CONVEYING AND DUST COLLECTORS** — Bulletin 10-H-53 — Describes the Montgomery "Blow-Rite" system for pneumatic conveying and for dust collecting—intended to handle the most difficult type of job.—JACKSONVILLE BLOW-PIPE COMPANY.

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rosion, fabrication process—where needed—shock and vibration endurance.—A. M. BYERS.

**325** **SMOKE STACKS, STEEL OR IRON** — Catalog 200-S — Describes types, characteristics, and applications of various smoke stacks.—J. J. FINNIGAN CO INC.

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**366** **UNIT HEATER RATINGS**—Bulletin No. 231, 8 pages—Gives the Btu output rating for various models of 30 different makes of unit heaters. Tells how to figure condensing rates, how to select traps and determine heater output at various fan speeds.—ARMSTRONG MACHINE WORKS.

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**382** **ASPHALT HEATER**—Bulletin 8021—Describes the details of combustion chamber, tubular heat exchanger and related auxiliaries of the Todd Thermo-Convective Asphalt Heater. Shows how this automatic, low maintenance, high efficiency unit is especially designed to heat asphalt economically.—COMBUSTION EQUIPMENT DIVISION, TODD SHIPYARDS CORPORATION.

## PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

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**403** **VALVE OPERATORS, SPROCKET RIMS**—Bulletin 8S—Describes and illustrates adjustable sprocket rims with chain guides, and other forms of Babbitt valve operators and controls.—BABBITT STEAM SPECIALTY CO.

**410** **PIPE HANGERS**—Bulletin 151, 12 pages—Describes National counterpoise pipe hangers for high temperature piping systems in steam plants, refineries, chemical plants, and the like. Graphs give aid in selection. Dimensions, erection and field adjustment instructions. Illustrations of typical installations.—NATIONAL VALVE & MANUFACTURING COMPANY.

**419** **WELDED PIPING SYSTEMS**—Bulletin 49-A—Contains full information and illustrations on "Modern Pipe Welding Practices," describing the latest shop techniques and giving helpful information on field practices.—MIDWEST PIPING COMPANY, INC.

**438** **DRAINAGE TRAPS**—Catalog 152—Describes advanced trapping methods for solving drainage problems in your plant.—W. H. NICHOLSON & CO.

**475** **QUICK OPERATING VALVES** — Bulletin describes the unique Everlasting design that actually improves with use because of the self-tapping action at each operation, to assure a continuing tight seal. Explains advantages for boiler blow-off, tank outlets, water column blow down, fire protection and other service.—EVERLASTING VALVE CO.

**486** **BRONZE GATE VALVES**—Bulletin V-260—Gives in concise form the general specifications of standard bronze gate valves, including solder and brazed-end valves. Construction features illustrated with the 300 lb union bonnet gate valve.—THE FAIRBANKS COMPANY.

**492** **VALVE CONTROLLER** — Bulletin 3500, 8 pages, gives construction features, engineering design and data, characteristics and performance, specifications and applications, etc., of the "Positrol" Fisher Series 3500 Valve Controller.—FISHER GOVERNOR CO.

## MAINTENANCE PACKING GASKETS, LUBRICATION

**501** **LUBRICATORS** — Catalog 150, 12 pages—Illustrates and describes new design high pressure force feed lubricators for service up to 30,000 lb, for use in chemical plants, utility plants and the like. Dimensions, specifications, illustrations of typical installations. — MANZEL DIVISION OF FRONTIER INDUSTRIES, INC.

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**523** **HEAVY DUTY CLEANER**—Service Report, 2 pages—Tells application of Oakite Composition No. 24, a new detergent designed to remove extra heavy solids from iron and steel in one operation. Purpose, method of application, and suggested uses described.—OAKITE PRODUCTS, INC.

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**564** **ANTI-CORROSIVE PAINTS**—Bulletin, "The Application of Subox and Subalox Paints"—Gives the story of a complete paint system for weather, moisture and alkali protection, with details as to application.—SUBOX, INC.

**576** **MECHANICAL SEALING**—Catalog 455-SB—A family album describing various types of dura seals designed to meet specific operating conditions—a complete reference guide book. — DURAMETALLIC CORP.

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**618** **HEAVY DUTY BELT FASTENERS** — Bulletin F-100 — Describes Flexo Belt fasteners for heavy duty use in joining conveyor and elevator belts.—FLEXIBLE STEEL LACING CO.

**619** **WOVEN WIRE SLINGS** — Illustrated handbook shows construction details of gripper woven wire slings, with views showing how such slings are used for both production work and general materials handling. — THE CAMBRIDGE WIRE CLOTH CO.

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11-53-1

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| 157 | 169 | 173 | 202 | 215 | 241 | 243 | 250 | 254 | 257 | 267 | 269 | 314 | 318 | 325 | 352 | 356 |
| 366 | 379 | 382 | 401 | 403 | 410 | 419 | 438 | 475 | 486 | 492 | 501 | 521 | 523 | 549 | 552 | 564 |
| 576 | 606 | 618 | 619 | 621 | 634 | 643 | 695 | 702 | 715 | 757 | 784 | 796 | 806 | 809 | 810 | 854 |
| 874 | 916 | 956 | 960 | 994 | W1 | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 | W11 | W12 |
| W13 | W14 | W15 | W16 | W17 | | | | | | | | | | | | |

**Also send further information on following New Equipment (page 8)**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| K-1 | K-2 | K-3 | K-4 | K-5 | K-6 | K-7 | K-8 | K-9 | K-10 | K-11 | K-12 |
| K-13 | K-14 | K-15 | K-16 | | | | | | | | |

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**621** **POWER TRANSMISSION AND EQUIPMENT** — Catalog 40 — Gives comprehensive details of a complete line of power transmission including V-Belt drives, flat belt drives, pulleys, gears, chains, sprockets.—Industrial Division of CONTINENTAL GIN CO.

**634** **BULK CONVEYORS**—Book 2175—Describes many applications of the flexible Bulk-Flo conveyor, an economic means for handling free-flowing, granular, crushed, ground or pulverized material.—LINK-BELT CO.

**643** **AUTOMATIC MONORAIL TRANSPORTATION**—Bulletin AD-1A, 12 pages—Describes a complete range of automatic dispatch monorail systems for transfer of materials by remote control.—AMERICAN MONORAIL CO.

**695** **FLEXIBLE COUPLING** — Bulletin 50—Describes the Francke Pin Type coupling, probably the oldest coupling on the market, all metal, and providing for both angular and parallel misalignment.—JOHN WALDRON CORP.

## WATER TREATMENT, HEATING, VENTILATING, AIR CONDITIONING, REFRIGERATION, DUST & FUME CONTROL

**702** **WATER CONDITIONING**—Bulletin 611A, 20 pages—Gives comprehensive data on methods of conditioning water for boiler, process and general use, featuring zeolite water softeners of "double-check" design. Data on filters, purifiers, zeolites, ion-exchange resins, de-gasitors.—ELGIN SOFTENER CORPORATION.

**715** **PRIMING COAT FOR STEEL TANKS**—Bulletin 1—Describes a method of removing mill scale from carbon steel plates, angles and channels by dipping them in sulfuric acid, wash water, and phosphoric acid baths and then applying a special coat of priming paint to the outside surfaces while the steel is still warm. This Phoscote process removes mill scale and leaves a thin iron phosphate coating on the surface which improves the bond between the paint and the steel.—CHICAGO BRIDGE & IRON COMPANY.

**757** **DEMINERALIZATION**—Bulletin — Describes the principles of demineralization of water for process and boiler feed applications—explains the chemistry and various processes and equipment used. Tables, diagrams, installation views.—GRAVER WATER CONDITIONING CO.

**784** **REFRIGERATION VALVES AND FITTINGS**—Catalog 0, 40 pages—Describes valves and fittings for ammonia, Freon and other refrigerants, for use in industrial refrigeration, ice making and air conditioning.—FRICK CO.

**798** **WATER TREATMENT**—Bulletin 51, 8 pages—Lists 94 Nalco products by number and describes briefly their composition and use—lists principal industries using such products and typical applications in these industries.—NATIONAL ALUMINATE CORP.

## ELECTRICAL

**808** **MOTORS AND GENERATORS**—Brochure 190, 12 pages—Gives the design, engineering data, performance, and applications of Electro Dynamic motors and generators. Charts aid in selection of size and type. Electrical and mechanical modifications available for particular installation needs.—ELECTRO DYNAMICS DIVISION, GENERAL DYNAMICS CORP.

**809** **GEARMOTORS**—File PB 12000-1-453—Illustrates and describes a new line of gear motors featuring a wide selection of compact, integral power units, with single (750 to 280 rpm), double (230 to 45 rpm) or triple (37 to 7.5 rpm) speed reduction.—ELLIOTT COMPANY.

**810** **MOTOR STARTING SWITCHES**—Bulletin 600—Describes a manually operated snap switch with thermal overload device for small motor application. Meets 1947 NEC ruling.—ALLEN-BRADLEY CO.

**854** **ADEQUATE WIRING** — Booklet "Wire Ahead"—Discusses preventive maintenance in electrical systems—the symptoms of inadequate wiring—and plans for anticipating electrical demands.—ANACONDA WIRE & CABLE COMPANY.

**874** **RUBBER-INSULATED CABLES**—Technical Data Book OK-1075, 128 pages — "Rubber-Insulated High Voltage Power Cables Up to 35,000 Volts" deals with advantages, economics, and versatility of this type cable. Contains current carrying capacity tables, aluminum conductor conversion factors, formulas for calculating effects of shielding, dimensional data, installation recommendations, methods for determining conduit size, fill and area, and for bending radii and pulling tensions.—THE OKONITE COMPANY.

## MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

**916** **INTEGRAL DUST COLLECTORS**—Catalog 310—Describes the Aerotec integral dust collector for application to grinding, buffing and cutting machinery operations, and similar applications where a comfort or health hazard is involved.—THE THERMIX ENGINEERING CO.

**958** **SWIMMING POOL EQUIPMENT**—Bulletin WC-109—Describes a complete line of swimming pool equipment, including filters, chemical feeders, sterilizers, hair and lint catchers, pool cleaners, recirculating pumps, heaters, fittings and accessories—dimension, capacity and other tables.—GRAVER WATER CONDITIONING COMPANY.

**960** **UNIT HEATERS**—Thermoflier Catalog—Describes the important features of Thermoflier unit heating, an economical method of adequate plant heating.—GRINNELL CO., INC.

**994** **MULTICLONE MECHANICAL DUST COLLECTORS** — Booklet M-204—Describes, with illustrations and diagrams, the basic principles of dust recovery by mechanical means at maximum efficiency.—WESTERN PRECIPITATION CORP.

*Continued on page 117*

11-53-3

**Please send me without obligation, free booklets described in the November, 1953, issue of SOUTHERN POWER AND INDUSTRY as circled below.**

| | | | | | | | | | | | | | | | | |
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| 1 | 8 | 14 | 22 | 25 | 29 | 33 | 48 | 51 | 76 | 77 | 85 | 91 | 93 | 102 | 104 | 106 |
| 157 | 169 | 173 | 202 | 215 | 241 | 243 | 250 | 254 | 257 | 267 | 269 | 314 | 318 | 325 | 352 | 356 |
| 366 | 379 | 382 | 401 | 403 | 410 | 419 | 438 | 475 | 486 | 492 | 501 | 521 | 523 | 549 | 552 | 564 |
| 576 | 606 | 618 | 619 | 621 | 634 | 643 | 695 | 702 | 715 | 757 | 784 | 796 | 806 | 809 | 810 | 854 |
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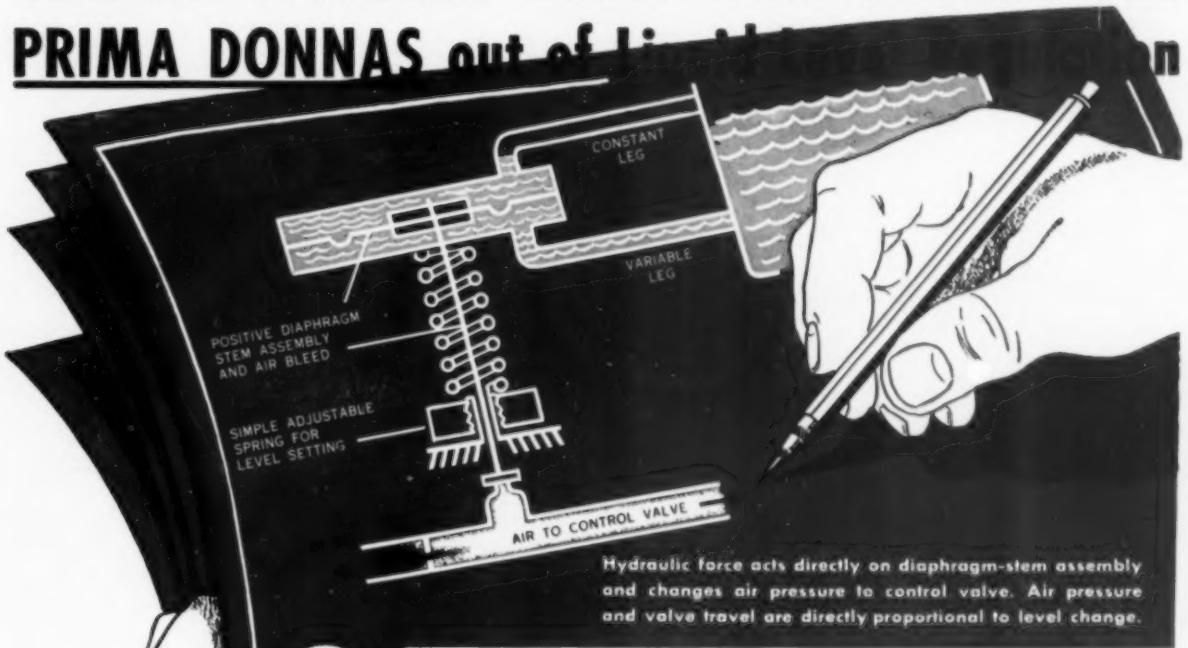
# LESLIE *Floatless* Level Control takes the PRIMA DONNAS out of Li... n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POSITIVE DIAPHRAGM STEM ASSEMBLY AND AIR BLEED
SIMPLE ADJUSTABLE SPRING FOR LEVEL SETTING
AIR TO CONTROL VALVE

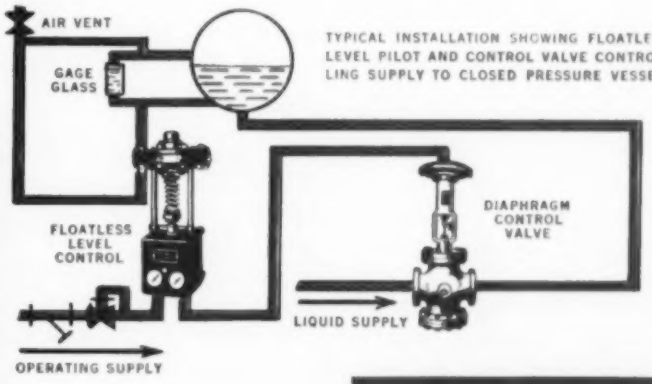
Hydraulic force acts directly on diaphragm-stem assembly and changes air pressure to control valve. Air pressure and valve travel are directly proportional to level change.

Here is level control that is not affected by surface agitation, equipment vibration, or the roll of a ship—a simple design that provides steady, positive, precise control even under extreme conditions.

Thousands are in service today, providing accurate control of liquid level (plus or minus 1" water column) and eliminating the problems caused by troublesome linkages, torque tubes, floats and stuffing boxes.

**Note these special features—**

1. **Can be installed anywhere below liquid level . . . on control panel, if desired.**
2. **Simple, compact, one adjustment unit . . . weighs only 40 lbs.**
3. **Diaphragm stem assembly is only moving part. Diaphragm element doesn't require recalibration during service.**

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**SEND FOR DESCRIPTIVE DATA PC-37**

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Here's *another* LESLIE *standard* item to fit specifications that are *special* orders with most manufacturers. When specifying pressure, temperature or level controls—for new or replacement service—it will pay to check *first* with your nearest LESLIE engineer. He's listed in the classified telephone directory in principal cities . . . under "Regulators" or "Valves"

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*Since 1900*

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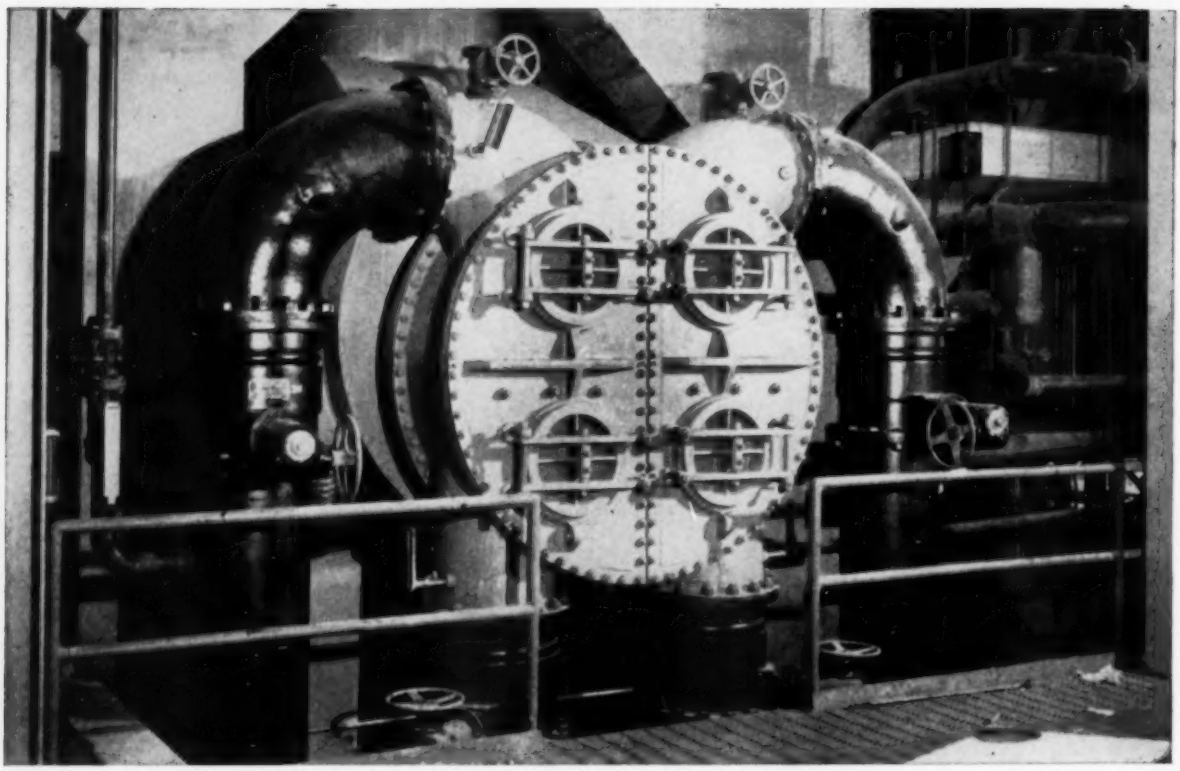

# CONSECO 2-PASS CONDENSER

## helps turn out low-cost power at Henderson, Kentucky Plant

Pictured above is the Conseco 6000 sq. ft. 2-pass, divided-flow condenser installed in the Municipal Power Plant of Henderson, Kentucky.

This Conseco unit handles a 5000 kw. turbine. Also installed in this modern municipal plant is a Conseco twin-element, two-stage air ejector & a single element, non-condensing hogging ejector.

*WRITE* for latest engineering bulletins on Conseco Condensers, Ejectors and other power plant equipment. They point the way to smoother plant operation and lower power cost.

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PRODUCTS *include:*

**BOILERS**
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# A-S-H HYDROVAC*ING*

## keeps this new plant spic and span

The William J. Neal Station at Velva, N.D.

**Good housekeeping** is a watchword at Central Power Electric Cooperative's plant in North Dakota. Located near the Souris River, this new lignite-fired plant is a major factor in developing this rich area.

The installation includes two boilers, each with a steam capacity of 230,000 lb. per hr., a design pressure of 975 psi, and a total temperature of 905°F.

The lignite residue is handled by a pneumatic Hydrovac System equipped with manually-operated valves, and is discharged through primary and secondary collectors into a storage silo.

Power-plant cleanliness with economy is a result of A-S-H pioneering. Ask our engineers for suggestions toward solving your materials handling problem. Write or wire.

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# NAVCO "Universal" PIPE SUPPORTS

Vertical adjustment up to 2½ inches can be made.

Support may be turned to any angle of 360°.

Will take care of 8 inches of travel.

## Features

Universal Pipe Supports hold the pipe down as well as up. They prevent pipe from getting out of alignment, which is usual when Roller Supports are used.

They permit control of expansion movement and insure the desired free action of Slip Expansion Joints so essential in tunnel and duct work.

Expansion movement of pipe will not disturb the insulation.

Made in Cast Iron or Steel and provided with forced lubrication for lines exposed to the weather.

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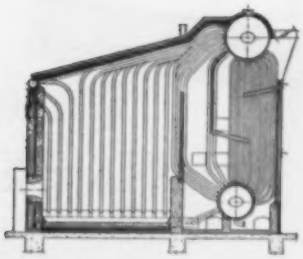
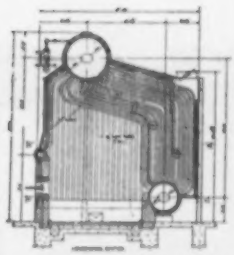


2 Drum Water Tube Boiler



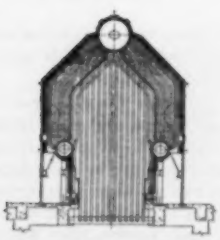
Type-S 2 Drum Boiler Series 51

# FOR ALL INDUSTRY . . .

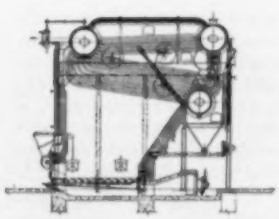
# WICKES

## STEAM GENERATORS

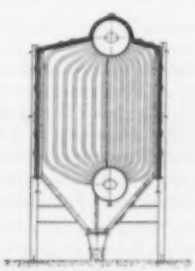
• In the oil, paper and chemical industries and in manufacturing plants, institutions and public buildings throughout the world Wickes Steam Generators are in constant daily service. All types, such as those illustrated on this page, with capacities up to 250,000 lbs. steam per hour and 1000 psi. Write for descriptive literature.



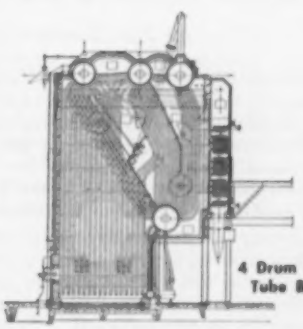
"A" Type Water Tube Boiler



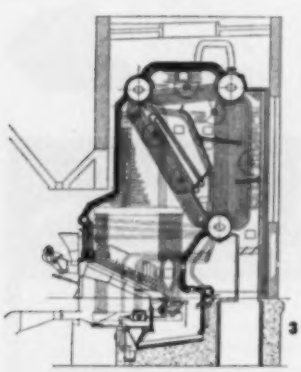
3 Drum Low Head Water Tube Boiler



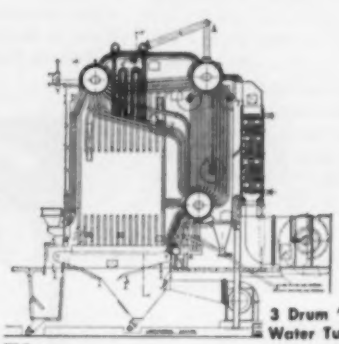
Wickes 2 Drum Waste Heat Installation



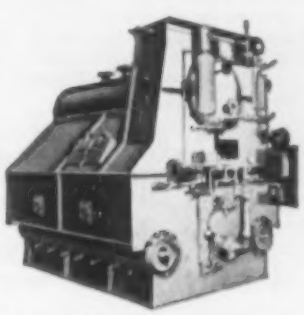
4 Drum Water Tube Boiler



3 Drum Water Tube Boiler



3 Drum "B" Type Water Tube Boiler



Type "A" "Packaged" Steam Generator

**THE WICKES BOILER COMPANY** • DIVISION OF THE WICKES CORPORATION, SAGINAW, MICHIGAN

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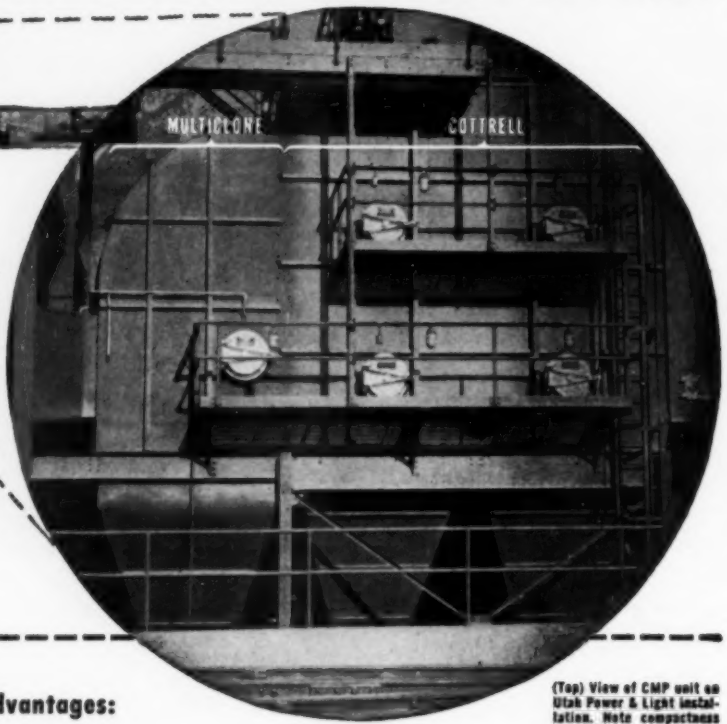
# Consider these important advantages of a WESTERN PRECIPITATION CMP UNIT!

**IF YOU are planning the installation of any type of fly ash recovery equipment—mechanical or electrical—it will pay you to investigate the extra advantages to be gained by installing a CMP Unit designed, engineered and constructed under *one* responsibility by Western Precipitation Corporation—*leaders in both electrical and mechanical recovery fields!***




(Top) View of CMP unit on Utah Power & Light installation. Note compactness of unit. (Above) Close-up of same installation.

## Combines Mechanical and Electrical Advantages:

**A CMP (Combination Multiclone-Cottrell Precipitator) Unit combines—in one compact installation—both mechanical and electrical recovery principles, so that maximum benefit is obtained from the advantages inherent in each method. The MULTICLONE section centrifugally cleans the gases of the larger and heavier fly ash particles (down to a few microns in diameter) . . . and the COTTRELL Precipitator then electrically removes the very small particles remaining in the gases. This combination arrangement has important advantages:**

1. Using the MULTICLONE for cleaning out the heavier particles permits the bulk of the recovery operation to be performed with relatively low-cost equipment.
2. Using the COTTRELL for final clean-up insures unusually high recovery efficiency—approaching theoretically perfect, if desired—with a high efficiency, compact Precipitator unit.
3. Each type of unit—MULTICLONE and COTTRELL—can be arranged for its most efficient application. MULTICLONES may be connected to each separate boiler, if desired, and their draft requirement cut out when the boiler is down . . . while a central COTTRELL handles all gases and operates at higher efficiencies, with continued low power cost, when one or more boilers are down.
4. During soot-blowing periods, or while warming up cold boilers, the MULTICLONE efficiency usually increases, preventing overloads of detrimental carbon from reaching the COTTRELL.

## Only Western Precipitation Combines Multiclone and Cottrell "Know-How"—In ONE Organization!

A vital factor in obtaining maximum efficiency and economy in CMP installations is the proper balance of mechanical and electrical recovery equipment to the individual requirements of *each* application. Western Precipitation is unique in that it not only pioneered the commercial application of COTTRELL Electrical Precipitators over 43 years ago, but also has been a leader for many years in the *mechanical* recovery field with its widely-recognized MULTICLONE Collectors.

*Result*—Western Precipitation has the all-important "know-how" and experience in BOTH fields . . . knows from first-hand experience how to fit the *right* equipment in the *right* place, to do *your particular* job . . . and can provide the complete installation under ONE responsibility and ONE overall guarantee!

**Let Our Experienced Engineers** study your recovery requirements and make recommendations on the equipment best suited to your operations. A wire, phone call or letter to our nearest office places this unique "Know-How" at your service, without obligation!

*Send for descriptive literature!*

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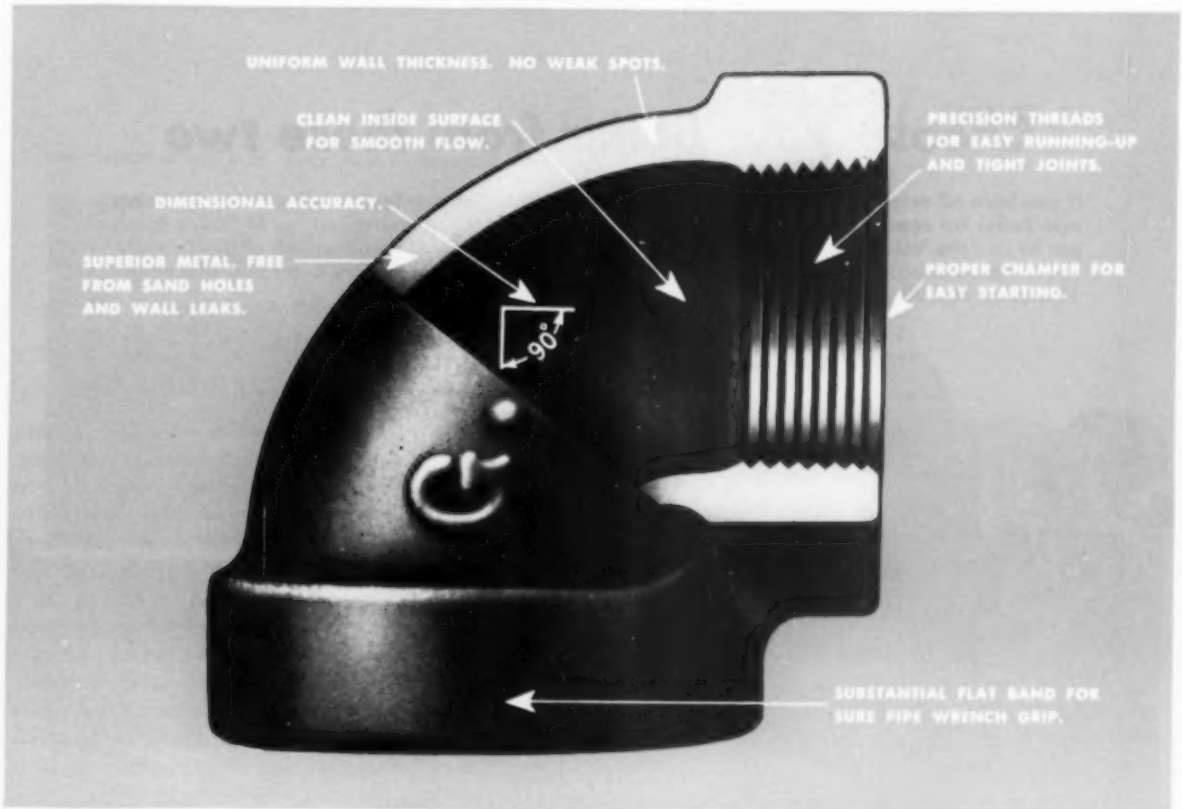
UNIFORM WALL THICKNESS. NO WEAK SPOTS.
CLEAN INSIDE SURFACE FOR SMOOTH FLOW.
PRECISION THREADS FOR EASY RUNNING-UP AND TIGHT JOINTS.
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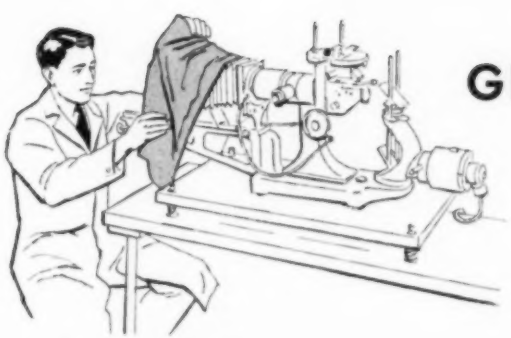
90°
PROPER CHAMFER FOR EASY STARTING.
SUBSTANTIAL FLAT BAND FOR SURE PIPE WRENCH GRIP.

# Rigid Inspection

**From foundry to finished fitting—modern inspection methods insure the quality of**

## GRINNELL PIPE FITTINGS



*The "Photomicrograph"*
*By means of photomicrographs, the metal structure of castings is thoroughly checked for full information on production quality.*

For instance, for malleable fittings, laboratory technicians make an hourly chemical analysis of foundry metal to insure uniform, high quality. Daily tests by photomicrograph reveal metallurgical structures. Sample bars from each melt are subjected to tensile strength tests . . .

Fittings must pass a 100% inspection both before and after machining. Quality control includes alignment tests, high pressure hydrostatic tests, and comparator checks on the accuracy of threads and chamfer.

That's why, when you specify Grinnell cast iron and malleable iron pipe fittings, you are sure of—

- High quality metal
- Dimensional accuracy
- Clean inside surface for smooth flow
- Proper chamfer for easy starting and protection of first thread
- Precision threads for easy running-up and tight joints

To make fittings the safest, strongest link in your piping system . . . choose from the wide Grinnell line. Available from your local Grinnell Distributor or a Grinnell Warehouse.

**GRINNELL**
**WHENEVER PIPING IS INVOLVED**

**Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors**

**Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems**

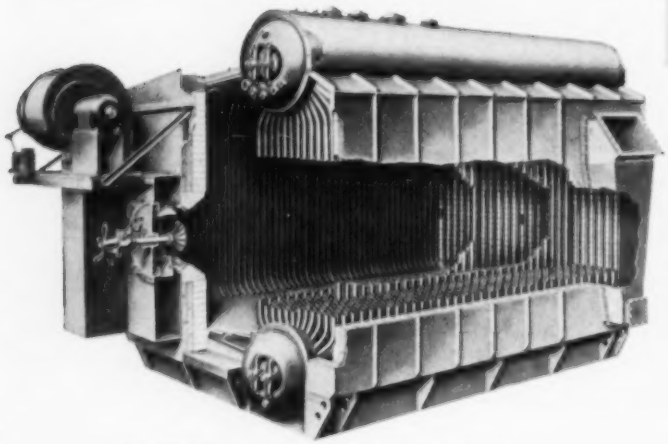
FOR STEAM CAPACITY up to 60,000 POUNDS

# Choose your boiler from these two

**If you burn oil or gas, investigate the VP Package Boiler for capacities up to 30,000 pounds per hr . . . the VU-10 up to 60,000 pounds.**

**For stoker firing, the VU-10 is available from 10,000 to 60,000 pounds of steam per hour.**

**Whatever your fuel . . . whatever your steam capacity requirements up to 60,000 pounds per hour — you'll find that one of the Combustion Engineering Boilers described below will be just right for you.**



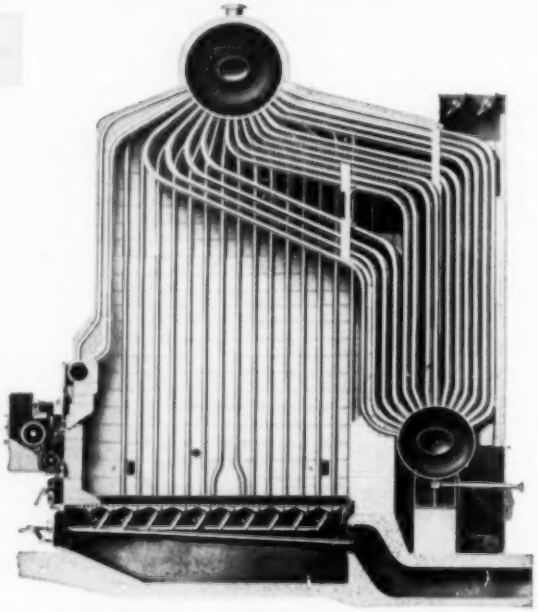
**The VP Boiler — the Package Boiler with EXTRA Features**

## THE VP BOILER

The C-E Package Boiler, type VP . . . completely shop-assembled . . . for oil or gas firing. It is available in capacities from 4,000 to 30,000 lb steam per hr; for pressures to 250 psi. The VP Boiler has more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. The large (30-in. diameter) lower drum permits a simple, symmetrical tube arrangement . . . greater water storage capacity . . . easy access for washing down or inspection. The centrifugal fan is efficient, yet its noise level is less than half that of typical high-speed blowers used on most package boilers. Baffle arrangement is simple, resulting in low draft loss . . . simple soot blowing . . . elimination of dead pockets . . . high heat absorption.

## THE VU-10 BOILER

The VU-10 Boiler is designed for industrial load conditions, particularly for plants with small operating and maintenance forces. Capacities range from 10,000 to 60,000 lb steam per hr . . . pressures to 475 psi . . . heat recovery equipment is available if desired. Fuel can be either coal (C-E Spreader, Traveling Grate or Underfeed Stoker) oil or gas. This boiler is a completely standarized design adaptable to many conditions. It responds readily to variations in load; it is simple to operate and maintain. All parts are easily accessible for inspection. Like the VP, the VU-10 Boiler is a complete unit — boiler, furnace setting, fuel-burning equipment, controls, forced draft — bringing you the benefit of one contract . . . one guarantee . . . one responsibility.



**The VU-10 Boiler,** as arranged for C-E Spreader Stoker firing

B-689B

COMBUSTION ENGINEERING, Inc.

**Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.**

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT

*Oh, I see*

**OIC VALVES** at work in the power plant at Ford Motor Company.

**THE CLEVELAND PLANT** of the Ford Motor Company, showing the engine plant, foundry and power plant.

# ...they're using our valves at FORD

Ford cars are an example of true manufacturing efficiency. Ford buys only that equipment which can be relied upon to maintain or increase such efficiency.

OIC's Long Line of valves meets Ford's exacting specifications. They're used here on basic facilities and main piping systems for water, steam and air. Because they're precisely engineered for long, trouble-free service, OIC Valves can help you achieve maximum efficiency in control of flow. Write for catalog information or engineering assistance in selecting and applying valves.

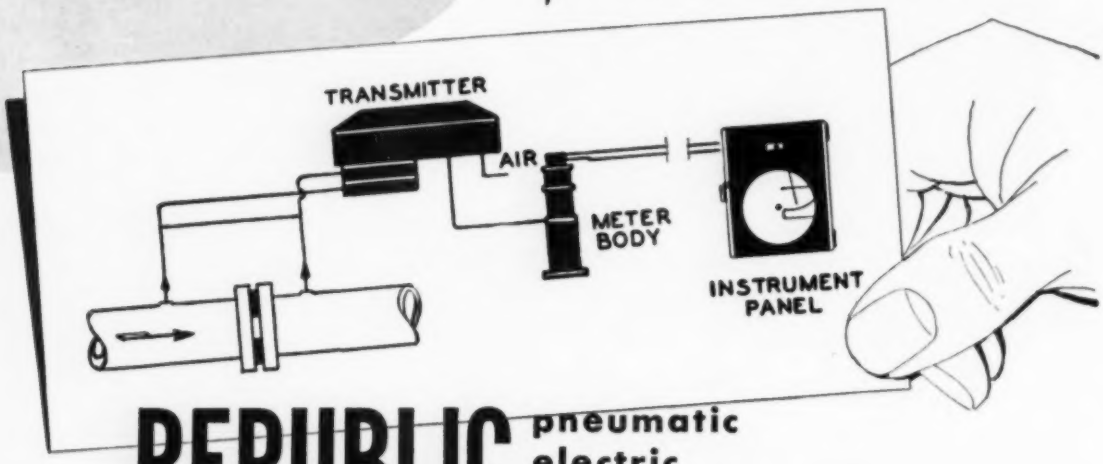
**THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO**

OIC FOUNDED 1883

**VALVES** | **FORGED & CAST STEEL, IRON & BRONZE, LUBRICATED PLUG VALVES**

# DO YOU HAVE THESE METERING PROBLEMS?

- TOXIC OR FLAMMABLE FLUIDS
- CORROSIVE FLUIDS
- DIRTY FLUIDS
- VISCOUS LIQUIDS
- WIDELY FLUCTUATING FLOW




# REPUBLIC pneumatic electric metering system

*offers a practical solution to* ***DIFFICULT FLOW MEASUREMENTS***

**RESTRICTS DANGEROUS FLUIDS . . .**
to short lead lines and small measuring chamber in pneumatic transmitter—keeps dangerous or high pressure fluids out of control rooms and mercury-type meter bodies.

**CORROSION RESISTANT MATERIALS . . .**
can be furnished for measuring chamber to meet requirements of almost any fluid. Corrosive fluids do not come in contact with any other part of meter.

**LITTLE MOVEMENT OF LINE FLUID . . .**
in lead lines and measuring chamber is required for full range. Dirt is not drawn in to clog meter and cause failure or inaccuracies.

**LINE FLUID AND MEASURING CHAMBER AT SAME TEMPERATURE . . .**
When measuring hot liquids which are very viscous at room temperature, transmitter may be mounted on flow line to keep temperature of liquid in measuring chamber and flow line the same.

**FAST ACTING . . .**
meter body does not require large movements of mercury or oil—follows all flow, no matter how erratic or fluctuating.

**OTHER ADVANTAGES . . .**

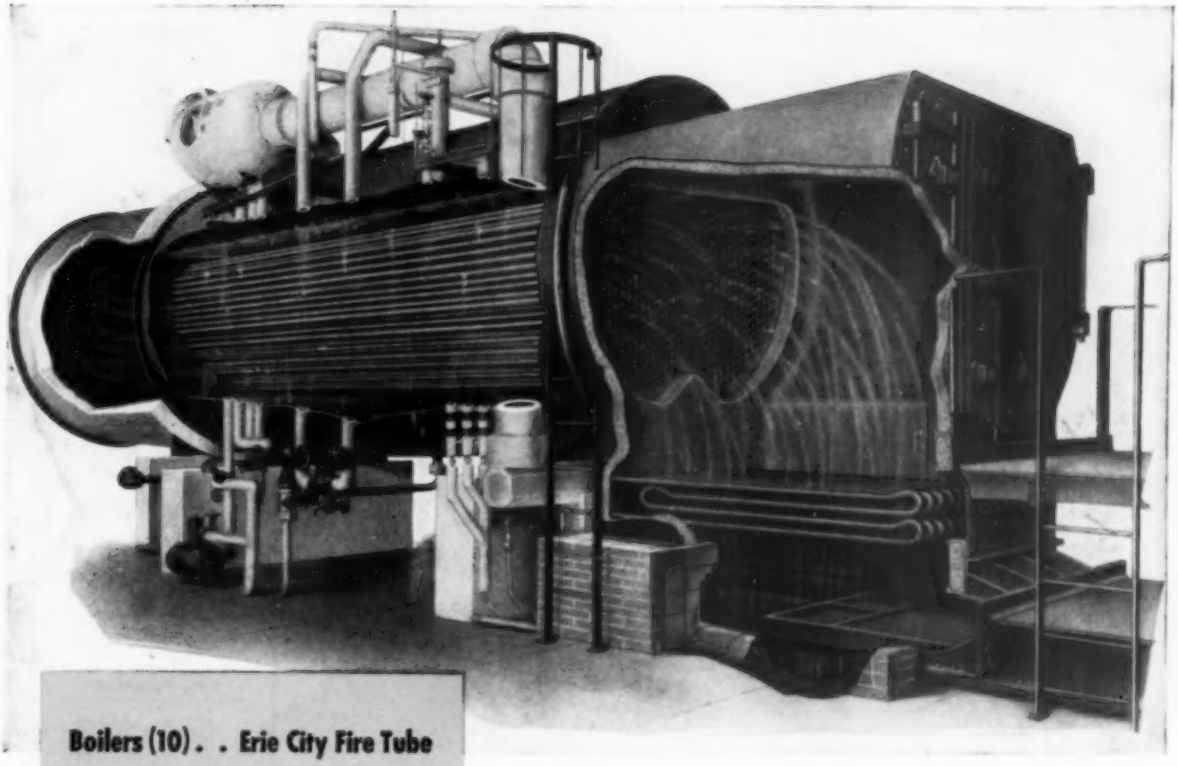
**ELECTRIC TRANSMISSION**
Flow information can be sent any reasonable distance. Electric meter body extracts square root from flow differential measurement, permitting use of uniformly graduated scales and charts.

**CONTINUOUS INTEGRATION . . .**
made possible by the exclusive Republic electric integrator aids in accounting and control of expensive fluids.

**REMOTE READING INSTRUMENTS . . .**
which include recorders, integrators and indicators, can be mounted separately or together, as desired.

***WANT MORE INFORMATION?***
A new bulletin describing the Pneumatic Electric Flow Meter and its applications is available at no cost or obligation. Send for Bulletin 704.

**REPUBLIC FLOW METERS CO.**
**2240 Diversey Parkway, Chicago 47, Illinois**



**Boilers (10) . . Erie City Fire Tube**

**Design Pressure . . . 300 p. s. i.**

**Capacity . . . . 15,000 lbs/hr.**

**Superheated Steam Temperature . . . 525° F**

**Fuel . . Waste gases from Open Hearth furnace enter boiler at about . . . . 1200° F**

**10 Erie City Fire Tube Boilers each "fired by" waste heat gases from Open Hearth Furnace**

# *Stop giving* WASTE HEAT

## *A Free Ride* from your Open Hearths

**Nickel Furnaces • Zinc Furnaces • Copper Furnaces Cement and Lime Kilns • Incinerators • Ore Roasters Silicate Furnaces • Chemical Industry Furnaces Paper Industry Furnaces**

IN these days of increased operating costs investigate the economy of waste heat recovery. A large steel producer tapped a source of wasted B.t.u.'s from 10 Open Hearths and converted them into 150,000 lbs. of 525° superheated steam per hour. Fuel is the big cost in steam generation; therefore "free fuel" will give you a head start in your steam generating program.

Erie City manufactures a complete line of fire tube and water tube waste heat type boilers and has wide experience in heat recovery.

Outline your waste heat conditions—our experience is yours for the asking.

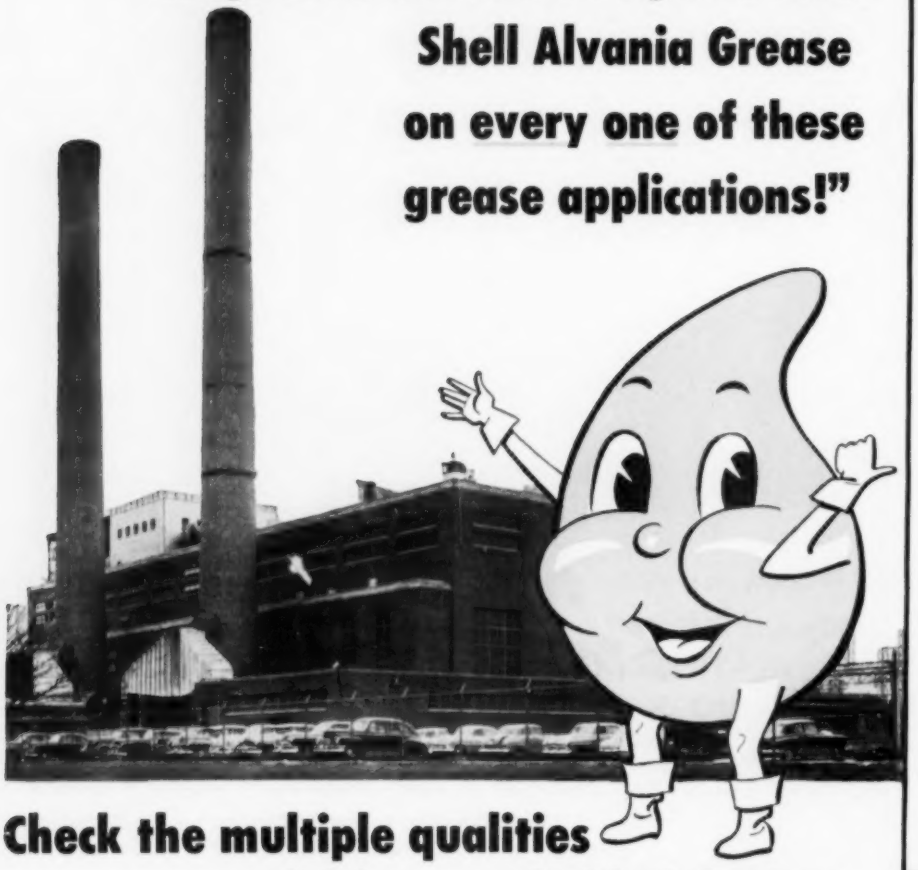
*You can depend on Erie City for sound engineering*

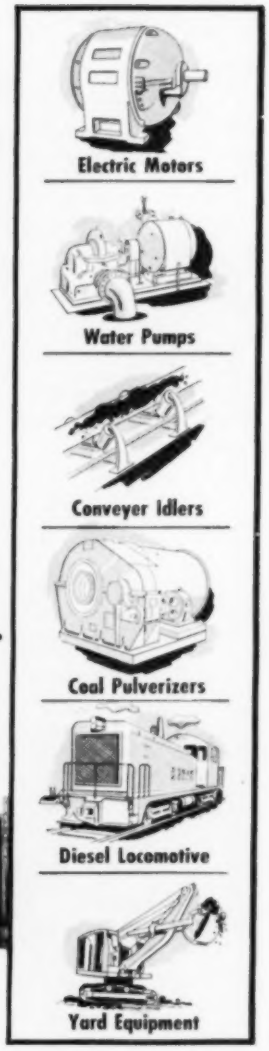
**ERIE CITY**
312 Years in Steam Generation

**ERIE CITY IRON WORKS • *Erie, Pa.***

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS

# "Indianapolis Power & Light Company's large new White River plant uses Shell Alvania Grease on every one of these grease applications!"






## Check the multiple qualities of this remarkable lubricant

Shell Alvania Grease is effecting important improvements in plant maintenance and purchasing practice. In plant after plant, this one grease is replacing the many special purpose greases formerly used . . . for *every grease application in the plant!*

**Look at these advantages:**

**1. Shell Alvania Grease flows** *freely* in cold temperatures, yet will not run out of bearings under excessive heat.

**2. Ideal for wet,** humid applications . . . it resists water emulsification.

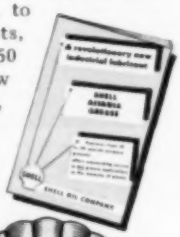
**3. Shell Alvania Grease has** extremely high oxidation stability.

**4. You'll find that** Shell Alvania Grease extends time between greasings . . . a substantial saving in labor and grease.

**5. Simple inventory . . .** just the one grease to stock and apply.

• • •

The economy of handling just one grease instead of *many* is an established fact. Write for the new booklet on Shell Alvania Grease . . . to Industrial Lubricants, Shell Oil Company, 50 West 50th Street, New York 20, N. Y.—or, 100 Bush Street, San Francisco 6, Calif.



**SHELL ALVANIA GREASE**

*The True Multi-Purpose Industrial Grease*

SHELL

# You get MORE CAPACITY with a FANMIX BURNER

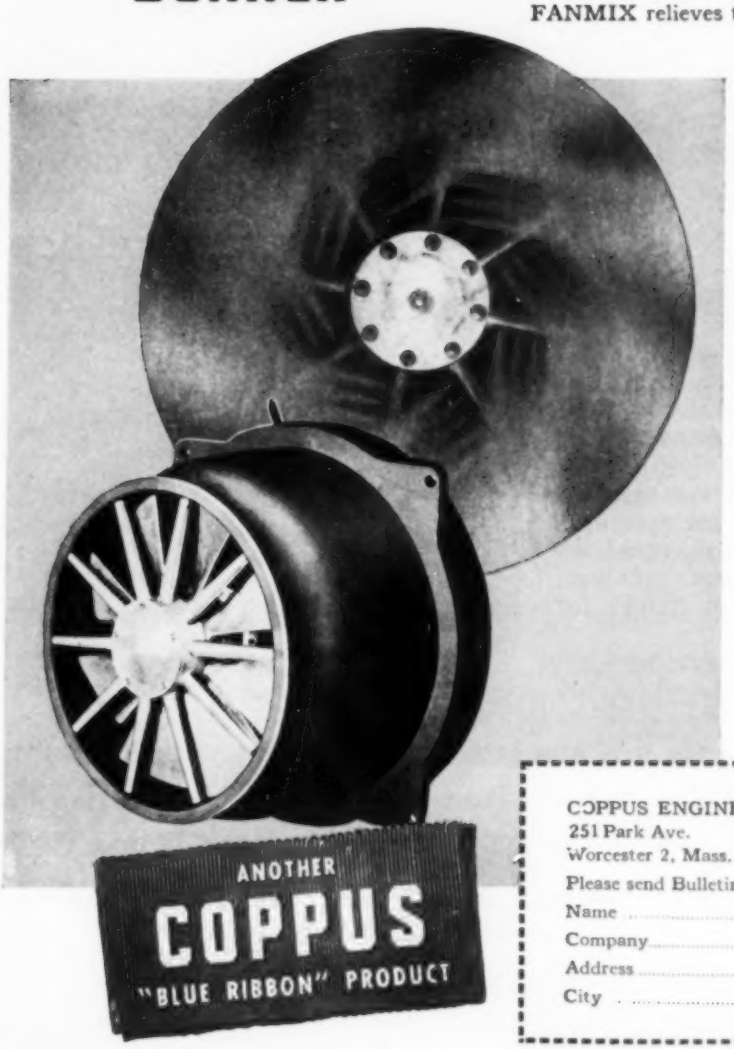
## Increase Boiler Ratings On Present Or Planned Equipment

In all types of Coppus-Dennis FANMIX Burners — straight gas or combination gas-oil — we utilize the energy of the fuel under pressure to drive the burner fan and deliver air in the proper proportion to the fuel flow. This exclusive "pinwheel action" *mechanically* mixes fuel and air in exactly the right proportions for truly radiant, non-luminous heat.

The result is uniform temperature everywhere in the combustion chamber — no drifting "hot spots" — and complete combustion under all conditions. That's why you can release more heat into your present furnace — why in new installations you get more heat into smaller furnace space.

### FANMIX Saves On Both Old and New Installations

FANMIX can easily be operated with your present furnace and stack, requiring only minor changes in other equipment. Or if you're planning on new boilers, remember that FANMIX relieves the furnace from the burden of mixing, creates its own forced draft and takes smaller pipe sizes. Which means you can plan on reduced combustion space, less stack, no forced draft equipment and lower installation costs all around.




### Get the Whole Story

Coppus engineers FANMIX Burners to meet individual requirements, providing complete control over heat pattern and combustion . . . Learn more about how "pinwheel action" can step up *your* boiler performance to peak efficiency and economy — as it is doing throughout industry. Send for Bulletin 410-6. Coppus Engineering Corp., Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" Products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG, and MINING CATALOGS.

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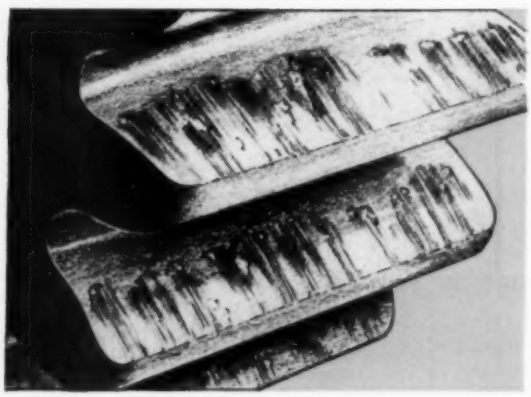
# switch to

# GULF E.P. LUBRICANTS

## *and get the benefit*

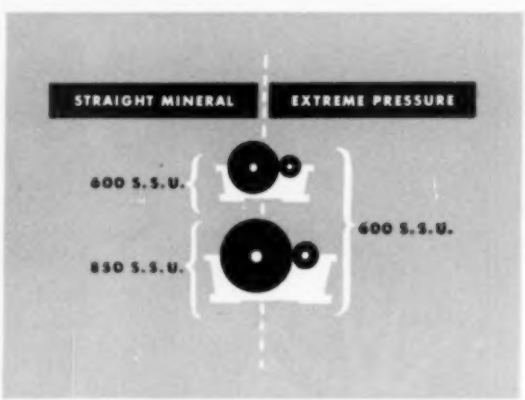
**1** **More effective protection against tooth scoring and welding**

Gulf E. P. Lubricants have proven ability to protect gear teeth against damage by scoring and welding. They are specially compounded to provide extra film strength and to prevent metal-to-metal contact under most conditions of overload and shock load. That's why you can usually avoid tooth damage like that shown at the right when you use Gulf E. P. Lubricants. And that's why they provide an extra margin of protection when production demands approach or exceed the rated capacity of the equipment.



**2** **Fewer lubricant grades needed— lubricant storage and handling simplified**

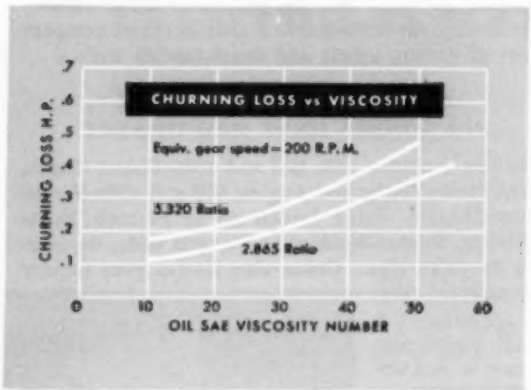
Because Gulf E. P. Lubricants have superior film strength, it is often feasible to use a lower viscosity grade than would be possible with a straight mineral oil. This is a practical advantage for plants operating several different types of gear drives. If, as pictured at the right, two straight mineral oils of different viscosity are specified, one grade of Gulf E. P. Lubricant may well do the job of both. Thus lubricant storage and handling is simplified, and there is less chance for confusion in the oil house.




Gulf E. P. Lubricants are available in the proper viscosity for every gear requirement, ranging from 55 to 1000 SUV at 210 deg. F. For specific recommendations for your equipment, call in a Gulf Sales Engineer. Write, wire, or phone your nearest Gulf office, or send the coupon.

for enclosed gear drives

# of these practical advantages:




## 3 Reduced power loss caused by churning in splash-lubricated units — lower power costs

There is another advantage in using a lower viscosity oil in splash-lubricated units where power loss due to churning is appreciable. Since this loss is almost directly related to oil viscosity, the use of lighter Gulf E. P. Lubricants often means reduced heat generation and lower power costs.

The chart at the left shows the effect of viscosity on the churning loss in horsepower of a typical gear unit.

## 4 Excellent protection against rust

The ability to protect polished gear teeth and antifriction bearings against rust is an important property of a gear lubricant, and is essential in a lubricant for units which are occasionally idle.

Gulf E. P. Lubricants have highly effective rust preventive properties—insure against excessive wear and enlarged tolerances which might result from the presence of abrasive rust particles.

GULF INDUSTRIAL LUBRICATION

**GULF OIL CORPORATION • GULF REFINING COMPANY**
**1822 Gulf Building, Pittsburgh 30, Pa.**

Gentlemen:

I would like further information on Gulf E.P. Lubricants: SPM

- ☐ Please have a Gulf Sales Engineer call.
- ☐ Please send me a copy of your pamphlet "Gulf E.P. Lubricants for Reduction Gear Drives."
- ☐ Please arrange to show a group in our plant the new Gulf Color Slide Film, "Gears and Their Lubrication," Part I.

Name _____

Company _____

Title _____

Address _____

# Modern approach to better power piping

# CRANE
## Pressure-Seal Bonnet
# VALVES

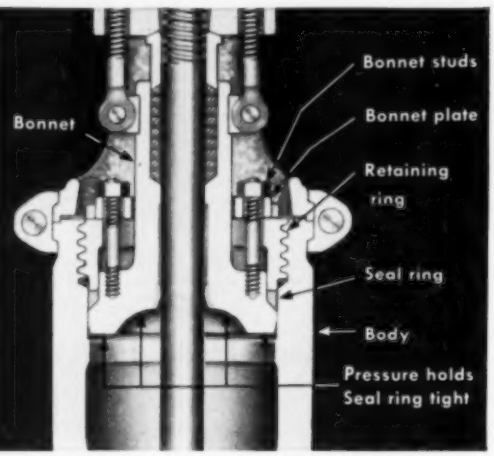
DROP A CARD TODAY—Ask for this new 16-page catalog and get acquainted with steel valve design that more than meets the rigid requirements of today's high-pressure, high-temperature power plant service. See how modern, proved Crane Pressure-Seal design makes possible a simpler, more compact valve of greater safety and dependability with—

**NO BONNET-JOINT LEAKAGE**
**NO BONNET-JOINT MAINTENANCE**

The line includes 600, 900 and 1500-Pound Gates, 1500-Pound Globe and Angles, 900 and 1500-Pound Stop-Checks. Sizes 1-inch up to 24-inch. Butt-Welding, Socket-Welding or Flanged ends, depending on valve type. Crane also invites your inquiry for unusual valve requirements.

### HOW CRANE PRESSURE-SEAL DESIGN WORKS

Why fight line pressure when you can *use it*—a good question that Crane successfully answers with the revolutionary Pressure-Seal Bonnet Joint. For line pressure is actually harnessed to keep the bonnet joint tight against leakage—and free from maintenance. As shown in the section to the right, the bonnet joint is inside the valve, and the sealing element is a wedge-shaped seal ring. Internal fluid pressure, acting upon the entire underside of the bonnet, forces the bonnet against the seal ring; this wedges the seal ring between the body and bonnet, forming a pressure-tight metal-to-metal joint. Thus maintenance of the joint is minimized, although the assembly is readily dismantled for inspection and just as readily reassembled.



**Companion line *Lip-Seal Bonnet* Globe and Angle Valves bring same advantages in sizes ½ to 2-inch—No bonnet-joint leakage, no bonnet-joint maintenance, better all-around serviceability. Ask for Circular AD1902.**

*THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON*

# CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
*Branches and Wholesalers Serving All Industrial Areas*

***VALVES • FITTINGS • PIPE • PLUMBING • HEATING***

# ANACONDA FORUM
## for the Electrical Industry

# ELECTRICITY FOR BETTER LIVING

*by M. E. Skinner,*
*Vice President and Director of Sales,*
*Union Electric Company of Missouri,*
*St. Louis, Missouri*

EVERYONE connected with the electrical industry has an obligation to exert some effort continuously to expand the future market for electrical goods and services.

There are many ways of carrying on such a program, but I know of none more basic and constructive than the promotion of more Adequate Wiring.

Notice I said *More* Adequate Wiring, for there never was and probably never will be a house that could permanently qualify as adequately wired.

### NEW USES FOR ELECTRICITY

We must recognize that new uses for electricity are developing at an amazing rate and that public acceptance of the electrical way of life is steadily increasing the demands placed upon the wiring system in every American house.

Most of the things that electricity does for us cannot be done satisfactorily, or in many cases at all, with any substitute form of energy. For example, you cannot enjoy a television show except with the help of electricity. As a result, I am sure that no television receivers remain unsold because of inadequate wiring.

However, many thousands of homes are not enjoying their television as they should because of inadequate wiring. People in these homes obtain mediocre performance from their sets and are unable to do other things at the same time the set is on because a lamp or some other appliance has to be unplugged to make way for TV.

### INADEQUATE WIRING MEANS LOST SALES

In the case of appliances whose function can be performed by some other form of energy, such as gas, our electrical industry is paying a heavy penalty in lost sales opportunities because of inadequate wiring.

We all know how difficult it is to portray these future possible uses of electricity—to a customer who is not now enjoying them—with sufficient force and reality to convince him, when he builds or buys a new home, of the necessity of investing now in sufficient copper, convenient outlets and switches to provide for the inevitable future which lies before him.

Maybe we never can, but we should be able to convince him of the importance of a basic foundation which will enable him to add to and expand his wiring as the need develops without tearing the house apart and starting over.

### REQUIREMENTS FOR GOOD WIRING

Entrance capacity to provide for future needs, availability of 230 volts at the panel for future additions of heavy-duty appliances, enough circuits so that there is some room to grow, a distribution center from which additional circuits can be readily taken off, and copper large enough so that you don't blow a fuse every time you start a room cooler—these are the foundations for a wiring system that can be adequate today and can be kept up-to-date as we progress toward Better Living Electrically.

---

### MONSANTO ENGINEER OUTLINES PROGRAM FOR KEEPING INDUSTRIAL POWER FLOWING

**ON THE NEXT PAGE,** Charles E. Knight plant engineer since 1948 for the Springfield, Mass. headquarters of Monsanto Chemical Company's Plastics Division, discusses the details of a well-rounded maintenance program for industry. Hard-working, likable, Mr. Knight has risen in only a decade with Monsanto from draftsman to his present important position. He was graduated from Mass. Institute of Technology in 1926, with a B.S. degree in mechanical engineering.

# MAINTAINING

## Electric power is a basic making the distribution

*by C. E. Knight*

**PLANT MAINTENANCE** and electrical engineering officials are best qualified to counsel management on present and future electric power needs.

ELECTRICAL power is one of the most important raw materials in modern industry, particularly since its use and distribution is not limited to a few departments, but is plantwide. As a result, an interruption in the delivery of this important raw material to any department can cause a major interruption of production. Enlightened plant management recognizes this fact and emphasizes the proper management of the organization charged with the responsibility for providing and distributing electrical power. This responsibility is normally assigned to a utilities group which is a unit of the Plant Engineering department. Regardless of the organizational position of the utilities group, it is essential that they be completely familiar with and consulted on any policy changes that effect changes in the use of electricity. Sales forecasts and long range expansion plans should be available for predicting loads.

The responsibilities of the Utilities Group are, in a broad sense, to provide the necessary electric power where needed throughout the plant; to be prepared, when an interruption occurs, to re-establish the supply by immediate repair of deranged equipment or use of auxiliary equipment; to keep informed of long-term planning as it affects requirements for electric power, transformers and distribution equipment and take timely steps to fulfill increased demands.

### FUNCTIONS OF UTILITIES GROUP IN PLANT ENGINEERING

In discharging this responsibility, the functions of the Utilities Group are divided into four major categories (1) Routine Maintenance (2) Preventive Maintenance (3) Preventive Engineering and (4) Long Range Planning. Because there is considerable overlap in these categories, a brief discussion of each phase may be helpful.

### (1) ROUTINE AND BREAKDOWN MAINTENANCE

This is the normal daily repair work that must be done, including major repairs resulting from breakdowns. Prerequisites for adequate coverage here are: complete drawing files; specifications for all transformers and distribution systems; a trained group of electricians completely familiar with electrical equipment and distribution systems; an adequate supply of spare parts.

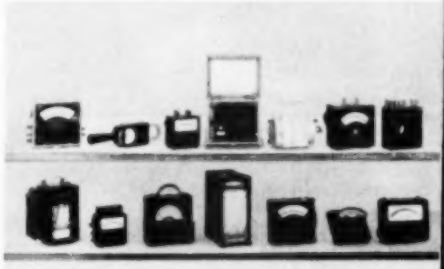
### (2) PREVENTIVE MAINTENANCE

The elements of a sound preventive maintenance program are familiar to all. It is essential that this program be carried out in an orderly manner and that the responsibility for its continuation be fixed. Check lists and periodic reports are a "must." These should include such things as visual inspection of poles, insulators, manholes, condition of contacts in switch gear; filtering of transformer oil; checking relay performance by test tripping; megging feeders to determine insulation conditions; inspection of switch rooms for physical condition and cleanliness.

The installation of either meter mounts or installed meters for checking loads on critical feeder lines directs attention to overloading and will help prevent voltage loss, excessive heating and attendant insulation breakdown.

Periodic adjustment or replacement of equipment, based on failure frequency reflected in the Repair History (part of the preventive maintenance program) will go a long way toward reducing costly, unexpected breakdowns.

Where continuous operation, such as is found in the petroleum and chemical industries, makes arbitrary maintenance shutdowns financially unattractive, these inspections, replacements and adjustments must be integrated into a flexible program that can be put in motion whenever production schedules or operating emergencies dictate a shutdown.



**INSTRUMENTS UNCOVER** electrical system deterioration and obsolescence. The number required varies with system complexity. Here are a few used by industrial service firms.

### (3) PREVENTIVE ENGINEERING

One of the most effective means of avoiding interruption of electrical service is the engineering of each change or addition to reduce the possibility of breakdown. Not only should new installations be so engineered but existing installations must be continuously studied in the light of experience and changing conditions to minimize the chance of failure. This function is one of the important duties of the Electrical Engineering group. In the location of feeders and distribution lines, such

# FULL ELECTRIC POWER IN INDUSTRY TODAY

**raw material for *all* industries. Here's a sensible program for system safe, adequate and less liable to costly breakdowns.**

*Plant engineer at the Springfield, Mass. headquarters of Monsanto Chemical Company's Plastics Division*

factors as the corrosive qualities of the soil (or the vulnerability of overhead lines), location of future buildings, and probability of increased demand must be considered. The type of insulation used on feeder lines should depend upon local conditions.

**IF YOU ARE INTERESTED IN REPRINTS** of this issue of the ANACONDA Forum, see your Anaconda Representative... or write to *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

Since most electrical distribution equipment has a relatively long life and is less subject to obsolescence than manufacturing equipment, it is generally good management to use the highest quality equipment obtainable. A few dollars saved may be wasted many times over as a result of a service interruption. Choice of cable is a practical example of this, since the cost of a cable failure, considering downtime and replacement, will probably nullify the "saving" realized in an installation of inferior quality.

Standardization in the design of distribution systems and switch gear reduces the spare-part inventory and can result in substantial savings during alterations. The use of several transformer stations, each protected with suitable interrupting switches, tends to localize emergencies. These are but a few of the ways in which a qualified electrical engineering staff can and must aid in insuring uninterrupted supply of electrical power.

### (4) LONG RANGE PLANNING

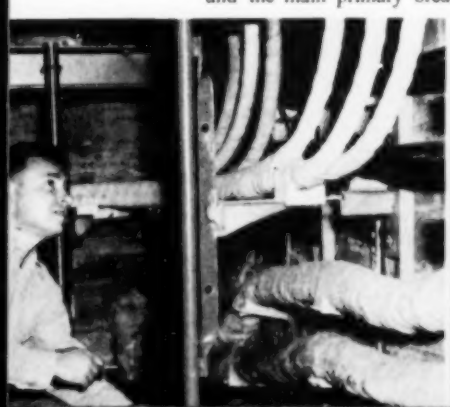
It is in this field that a plant's electrical engineering group must function as an integral part of plant management and be a part of the policy-making group where production operations and their power requirements are concerned. Forecasts of power requirements based on sales forecasts and long range expansion plans must be established and revised periodically to provide the hypothesis for engineering studies of modifications to meet anticipated needs.

This approach avoids the frequent difficulty of a distribution system growing "like Topsy," which eventually necessitates a complete and costly replacement of the entire system or inefficient use of existing equipment. Any modifications or additions to the existing system are made to allow for future requirements. The installation of manholes or feeder ducts can be made with provision for additional capacity when needed. Switch rooms and sub-stations are built so that they are of sufficient capacity or can be enlarged to handle future needs. Although electrical distribution equipment has a relatively long life, it is often made prematurely obsolete by plant expansion. The above approach can tend to minimize this problem.

*(—continued on next page)*

**LOAD TESTS** frequently uncover mechanical defects that overload motors and cause failure.

**PREVENTING COSTLY SHUTDOWNS.** At Monsanto Chemical Co. inspection plays a big role in keeping power flowing. Here electricians regularly inspect such vital parts of the system as the distribution lines in a power tunnel and the main primary breakers in a substation. Even the brushes on a 700 hp. motor-generator are checked.



(—KNIGHT, *Continued*)

### KNOW YOUR UTILITY, CONTRACTOR AND EQUIPMENT SUPPLIER

Woven through the entire program for providing uninterrupted distribution of electrical power, both for current operations and for future expansion, must be the relations with the utilities company, the electrical contractor and electrical equipment supplier. In spite of the best-laid plans, emergencies will occur during which the services of any or all of these can be invaluable. In long range planning, their experience and knowledge of factors not a part of plant operation can frequently aid in formulating a more sound program. It is important that the plant electrical engineering group establish and maintain friendly relations with these organizations.

### WHAT UNINTERRUPTED ELECTRIC SERVICE REQUIRES

In summary, the importance to the plant, of an electrical distribution system that is adequate, safe and maintained so as to avoid any interruption of power distribution cannot be over-emphasized. Providing this service requires: a staff of technically trained electrical engineers; an electrical shop with adequate tools and staffed with competent electricians thoroughly familiar with the system; a serious preventive maintenance program; a reliable supply of electrical equipment and cable both in the plant and/or available through a distributor; close liaison with top management on major fluctuations in or expansions to production activity. Integration of these points into a well-formulated program will produce the desired result.

### ANACONDA REVIVES INDUSTRY-WIDE PROGRAM TO "POWER-UP— AND BE PREPARED"

Aimed at large industrials, "POWER-UP—And Be Prepared" tells plant executives that NOW is the time to modernize their plant wiring systems.

Utilities, contractors and distributors are being asked to cooperate in this program. Everybody benefits . . . when everybody ties in.

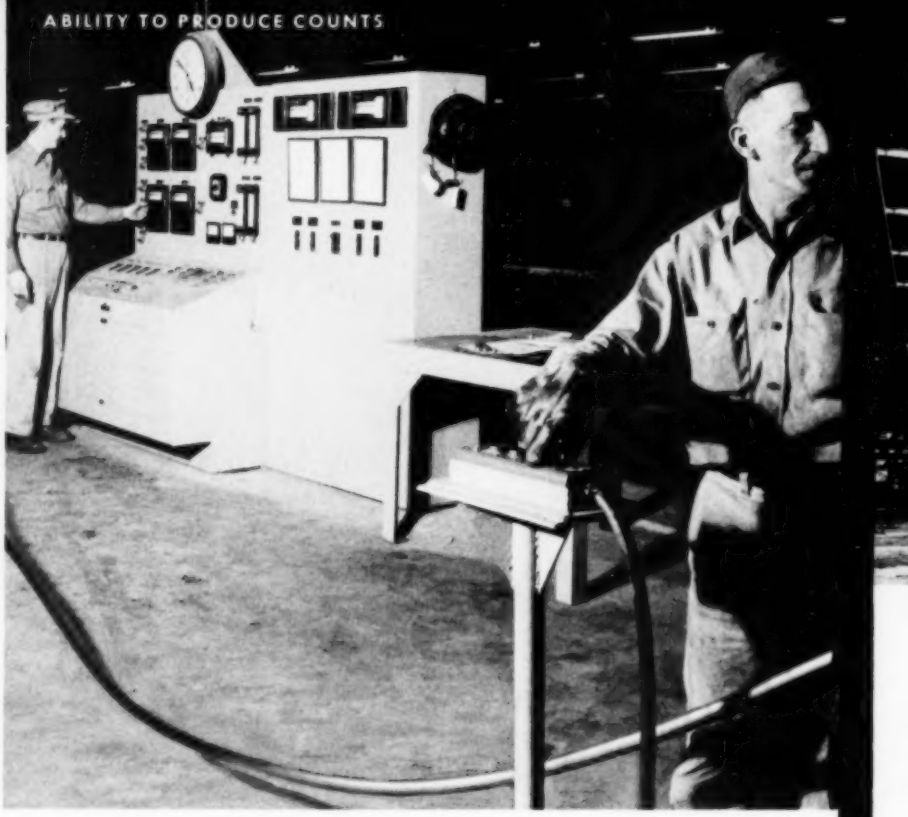
See your Anaconda Sales Office or Distributor now for full details and free promotion material.

## New "Full Power Ahead" Campaign Sells Wiring Modernization to

- **farms**
- **small industrials**
- **homes**
- **commercial enterprises**

The new FULL POWER AHEAD Program means new business for contractors and distributors . . . increased power sales for utilities. Anaconda has prepared a complete tool kit of promotion material to help you get your share of today's MULTI-BILLION dollar wiring modernization market. For more information write Anaconda Wire & Cable Company today. 63585


ABILITY TO PRODUCE COUNTS



# Now he pushes a button

## . . . and turns out a *better* cable faster

Old-time cable men—and younger ones, too—whistle when they watch this new lead-extruder at work at Anaconda. You touch a button . . . keep an eye on the instrument panel . . . and the cable rolls on the reel, ready to use. You don't stop for refills. This extruder works continuously.

It's a big gadget . . . and a *better* one for two reasons. It speeds up service to our customers. And it assures them of a quality product, more uniform than ever before. It's one more example of the modern methods Anaconda uses to give you better cables and cable accessories, made to standards that usually top recognized industry specifications.

In mills and mines, we've put our dollars to work in a vast program of improvement and expansion. It has three objectives:

1. *delivery of products in ample quantity to meet industry's needs.*
2. *development of new products to meet new needs or to meet old needs better.*
3. *quality consistently maintained through an exacting program of statistical control.*

Look at it from your side of the desk. You get better products, delivered faster, and lasting longer *when you specify* ANACONDA.

**Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.**

# ANACONDA®

**TODAY'S HEADQUARTERS FOR WIRE AND CABLE**

**MAKERS OF** building, barn, machine tool, control and communication wire • service and overhead distribution cables, bare and weatherproof including ACSR • portable cords and cables • power and busdrop cables • mine, bridge, aerial, underground, duct, network and submarine cables • parkway, airport and street-lighting cables • station, apparatus and vertical-riser cables • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories.

**FLUORESCENT LAMPS** need constant voltage for maximum operating efficiency and lamp life.

**Manual and Automatic Inductrols** in sizes (left) 6 to 9.6 kva and (right) 12 to 24 kva.

# Maximum equipment life—less operating cost with G-E voltage regulators

You can eliminate the harmful effects of undervoltage and overvoltage on your a-c electric equipment by installing G-E Inductrols. These dry-type regulators automatically maintain correct voltage and insure peak operating efficiency.

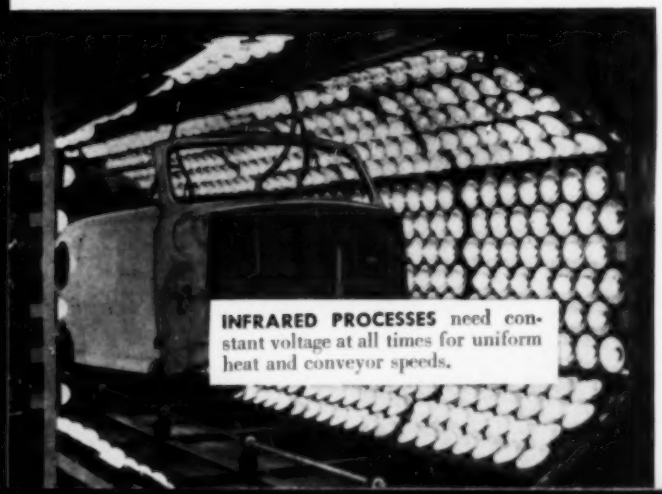
Standard automatic regulators are available for circuits from 3 kva, 120 volts up to 520 kva, 600 volts either single- or three-phase. For more information, contact your nearest G-E Sales Representative, or write for Bulletins GEA-5824, GEC-795 and GET-2351. General Electric Company, Section 423-202, Schenectady 5, New York.

*You can put your confidence in—*

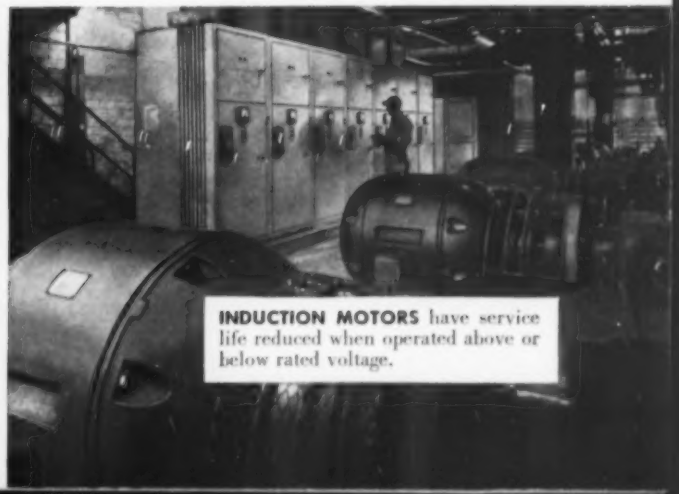
**GENERAL ELECTRIC**

## WHY YOU NEED GOOD VOLTAGE

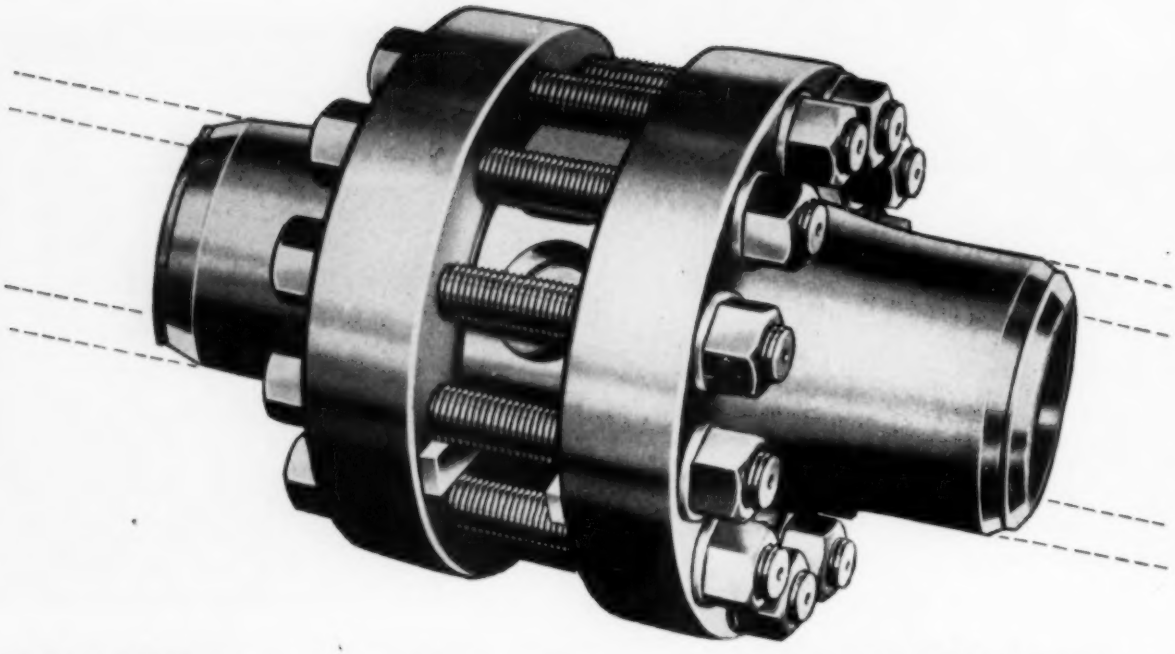
| EQUIPMENT | 10% UNDERVOLTAGE | 10% OVERVOLTAGE |
|---|---|---|
| INCANDESCENT LAMP BULBS | Cuts light output 30% —slows production | Cuts life 70% — triples costs |
| A-C MOTORS | Overheat—ups maintenance costs | Lowers power factor —ups power costs |
| RESISTANCE HEATERS | Cuts heat output 19% —slows production | Overheats—ups replacement costs |
| ELECTRONIC DEVICES | Probably destroy gas-filled tubes | Only 5% over cuts tube life 50% |
| INFRARED PROCESSES | Ups process time —slows production | Blisters, scorches— ups production cost |



**INFRARED PROCESSES** need constant voltage at all times for uniform heat and conveyor speeds.



**INDUCTION MOTORS** have service life reduced when operated above or below rated voltage.

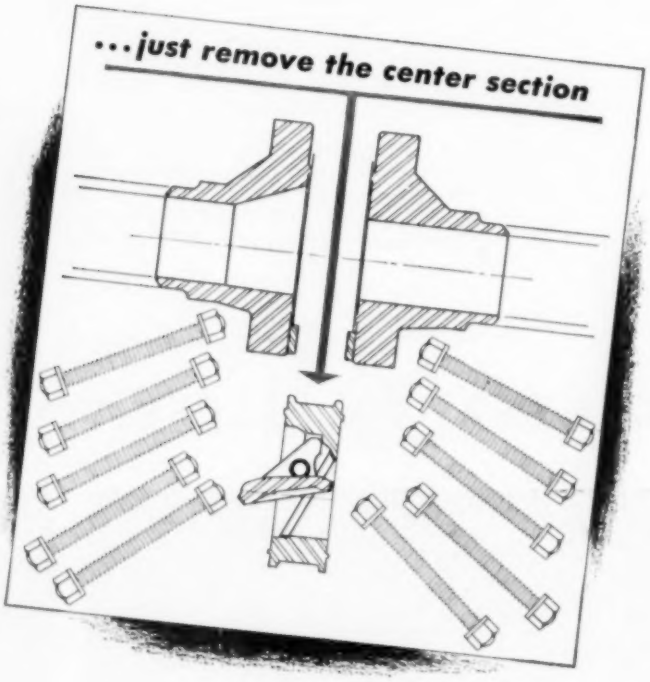


# NO NEED to cut this valve out of a Welded Line

## ...it's a CHAPMAN 3-PIECE TILTING DISC CHECK VALVE

Remove studs between inlet and outlet ends. Then the whole center section can be slipped out *as a unit* . . . and quickly and easily replaced. Figure the savings for yourself!

Here, Chapman design gives you the smooth operation and quiet closing of the 2-piece Tilting Disc Check Valve . . . with the unique advantage of practically immediate interchangeability of "the works." And *only* Chapman makes this complete line of Tilting Disc Check Valves. Send for your Chapman "Check Book" — *now!*




**The Chapman Valve Mfg. Co.**
INDIAN ORCHARD, MASSACHUSETTS

# Timely Comments

## Budget Business in a Nutshell

ONE DAY the head of a large maintenance organization called in his assistant and said, "What do you know about this maintenance budget business?" "Only what I have heard discussed around here," was the answer. "Why? What's up?" "Well," the boss replied, "I have a fully outlined procedure from the top brass. They are going to have a big meeting on it and I'd like to know what they do in other companies."

"I do have some clippings from various articles that have been published on the subject," said the assistant, "and I can pick up some more from our magazine files. I will see what I can get together for you in the short time that we have to review the situation."

**Here is the assistant's report.**

As requested, I have made a one-day, hurried study of readily available articles, and have pencil notes as to source and major contents. I have also discussed the major points with some of our own men who have had experience with maintenance budgeting in other plants.

The authors of the various articles studied are consultants, accountants, officers, plant managers and engineers. A good industrial cross-section of active operations is given. Nothing is found on difficulties, failures and weak points, but all admit that maintenance budgets are not easily set up and maintained. Highlights include:

1—It can be done and is done. Starting from scratch budgets can be developed and improved. Authors claim values exceed expense of operation. Some benefits enumerated are:

Improvement of maintenance operating practices.
Reduction of unknown or unchecked costs.
Better financial and management planning and control.
More intimate knowledge of operating details.
Intangible benefits (coordination improved, delays avoided, etc.).

2—Yearly (and interim) forecasts are made even though rough to start. Seemingly impossible detail listings have developed as programs continued.

3—Records are established, built up and analyzed. Costing is done at operating level in many cases, affording current knowledge.

4—The budget must have strong management support and real acceptance all the way down to the foreman level.

5—Work orders, appropriations, and a classified system of paperwork is a must. The preparation and maintenance of these records is not considered too burdensome, but is important to effective use of a maintenance budget and cost control plan.

6—Routine estimates and costs are kept separate from special and emergency items. Non-maintenance items are constantly so classified.

7—Many related maintenance problem-solutions are by-products of good budgeting. They include:

Production Department responsibilities defined.
Capital & Replacement Policy clarified.
Time study & Incentive methods facilitated.
Organization of crews more definite.
Scheduling more positive and crew efficiency improved.

8—Correlation of maintenance with product demands is recognized.

9—Plant Engineering is the keystone of budget preparation and control. Collaboration with all departments is expected.

10—Checks are made as to results obtained. Management is advised of the trends, results and reasons.

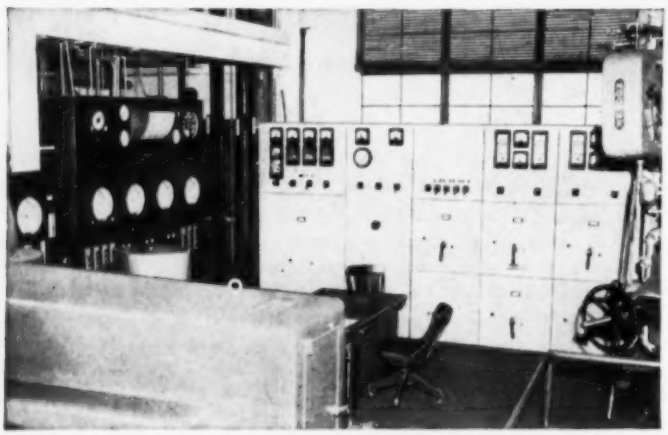
The articles claim budgets are workable and worth-while, but require real attention. They must be planned as to makeup and operation, accepted in spirit and performance, operated realistically and continuously examined as to results and improvements.

**EDITOR'S NOTE: This seems to boil down the essential elements of what maintenance budgets claim and do, and indicate the important details that are involved. It is obviously up to each organization to work out the degree of development and set-up existing or new procedures to arrive at the objectives desired. Most plants have the talent to take up the ball and carry it from here if the major principles are recognized and accepted.**

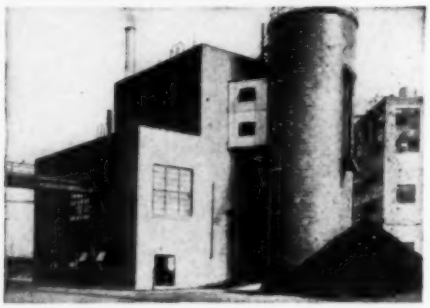
# Quaker Oats REDUCES STEAM COSTS BY BURNING COAL THE MODERN WAY

**"Our new coal installation produces steam at a cost of 32¢ per 1000 lbs. . . . reduces some operating costs about one half,"**

**says Walter H. Proescholdt**
**Asst. Chief Engineer**
**The Quaker Oats Company**



**Control center for combined boiler and turbine room operations at Quaker Oats' modern, new plant**



**To gain economy plus dependability,** Quaker Oats Company modernized the boiler room in its paper-making plant. One efficient, coal-fired unit now supplies all steam needed for heating, processing, and power generation.

**Boiler and turbine room operations combined.** With automatic controls and coal- and ash-handling systems, two men per shift can operate the combination boiler and turbine generator room shown at left. Quaker Oats has found that burning coal the modern way certainly increases efficiency of operation and cuts operating costs.

*Additional case histories, showing how plants of other types have saved money by burning coal the modern way, are available upon request.*

**Many power plants over ten years old** are as dated in efficiency as the automobiles of the same period. Ton for ton, coal burned in a modern plant can produce 10% to 40% more power. Modern coal- and ash-handling equipment can also cut labor costs substantially.

**Why not let a consulting engineer look over your plant?** Chances are he can point out ways of remodeling so that you can burn bituminous coal the modern way . . . and save dollars.

**It pays to burn coal efficiently,** because coal is not only an economical, but a dependable fuel. Coal reserves are virtually unlimited. America's coal industry is the world's most efficient and progressive. Thus you're assured of a plentiful supply of coal at relatively stable prices for generations.

**If you operate a steam plant, you can't afford to ignore these facts!**

**BITUMINOUS COAL** in most places is today's lowest-cost fuel, and coal reserves in America are adequate for *hundreds of years to come.*

**COAL** production in the U.S.A. is highly mechanized and by far the most efficient in the world.

**COAL** prices will therefore remain the most stable of all fuels.

**COAL** is the safest fuel to store and use.

**COAL** is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

**BITUMINOUS COAL INSTITUTE**

A Department of National Coal Association
Southern Building, Washington 5, D. C.

*FOR HIGH EFFICIENCY FOR LOW COST*

# *YOU CAN COUNT ON COAL!*

# Industry Speaks

SOUTHERN POWER AND INDUSTRY

## INDUSTRIAL RELATIONS

### Comments on advantages of university campus supervisory training over company program

THE ADVANTAGES of industrial relations training outside the company, especially for small organizations, were enumerated by Clifford H. Shumaker, director of The Institute of Management at Southern Methodist University, Dallas, at the semi-annual meeting of The American Society of Mechanical Engineers.

Emphasizing that the key man in any organization, from management's viewpoint, is the line supervisor, he pointed out that it is the exception to find one individual who combines the knowledge of production and job skills with the ability to manage people. Supervisory training given on a university campus has advantages over a company-operated program and it usually costs much less, even including transportation and subsistence. The program may be used or terminated at will without interfering with company plans and departments. Outside specialists in each subject encourage an overall view of business, and members from several companies in one group have a chance to exchange information. Getting the trainee into classroom surroundings is more conducive to training.

At the Institute of Management, instruction is given by the regular university faculty and specialists from industry. The company selects the men to be sent to class. Besides coming from different type companies the trainees educational background may range from third grade to doctor of philosophy.

To solve the problem of instructing such a heterogeneous group, classes are conducted on a strictly informal basis. Men are known by their first names, and jobs and titles are forgotten. Simple language is used. The advantage of mixed groups lies in the fact that each level of supervision represented gains an appreciation of the job and its problems. Mutual understanding develops out of the exchanged thoughts and ideas in such groups.

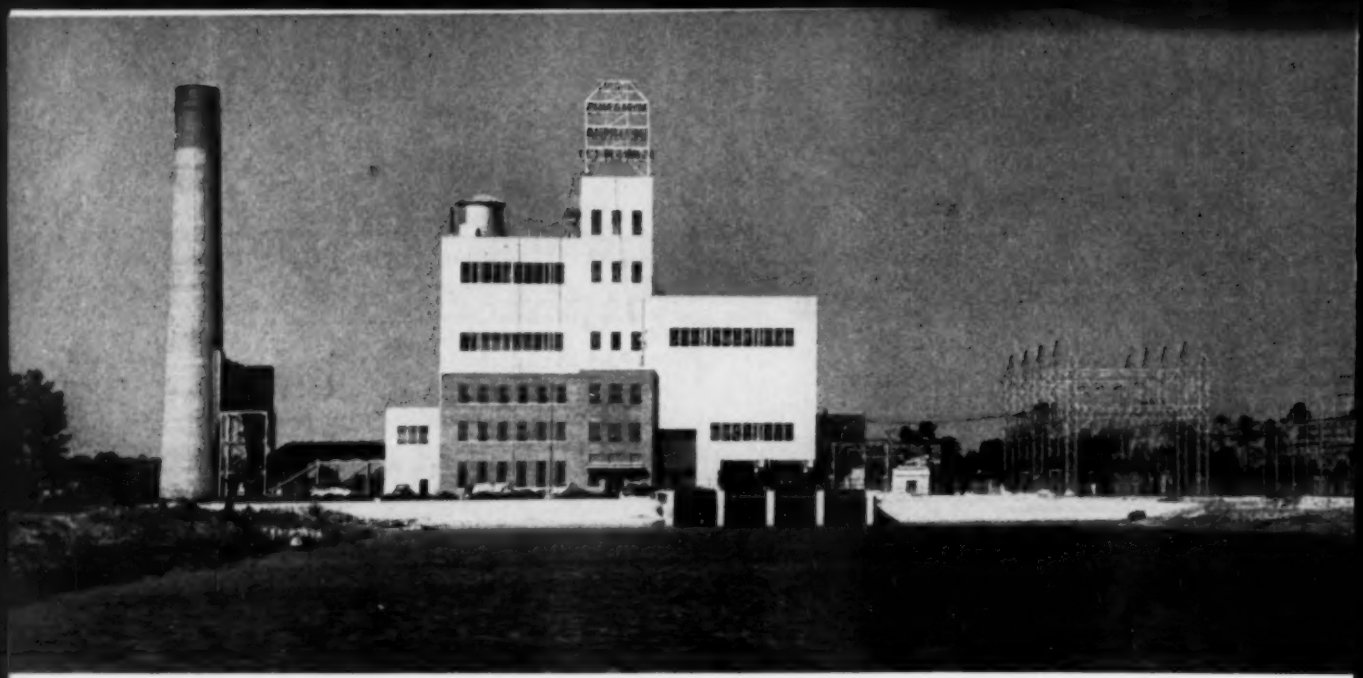
The Human Relations Institute is given in a period of four and one-half days covering 27 hours. Emphasis is on the foreman's responsibility rather than techniques. Sessions on understanding people develop the ideas that all human beings seek personal recognition, the worker wants to be treated as an end in himself, and the worker wants to feel that he is a real part of the total organization. Time is spent in analyzing the meaning of each major point and in stressing the manner in which the supervisor can satisfy these basic worker desires within accepted limits.

The techniques of maintaining communications and the importance of detecting and correcting faults are stressed. Emphasis is placed on the need for workers to be able to communicate freely and effectively with their supervisor.

The worker-supervisor relationship is discussed from both the union and nonunion points of view. Personnel selection and evaluation are discussed strictly from the viewpoint of the supervisor and not the personnel department.

The Institute of Management has carried on a successful program for the past five years, serving 236 companies which sent 2,468 individuals. The continued participation over a period of several years and the inclusion of all supervisory personnel by both large and small companies seems to prove the value of this type of training, Mr. Shumaker said.

"It is not possible to say that personal improvement has been so extensive as to be measurable in terms of avoiding labor troubles which would otherwise exist, or in reducing labor turnover, or in the many other ways which reflect good or bad industrial relations. But it is evident from the participation and reported individual progress that here is a means of conveying valuable information to a supervisor who, in turn, is receptive to it and who, in the great majority of instances, will put it to good use."



PLANT McMANUS, GEORGIA POWER COMPANY, BRUNSWICK, GEORGIA

# PLANT McMANUS

## Georgia Power Company's Newest Station

**By C. N. CROCKER, Jr.**

Results Engineer

Georgia Power Company

Brunswick, Georgia

*This new plant increases service to Georgia's fast growing coastal area. Relatively new type combustion control system is first of its kind installed by Georgia Power Company.*

GEORGIA Power Company's newest steam generating station, Plant McManus, is located on Crispen Island on the east bank of Turtle River, about six miles north of Brunswick, Georgia. The plant, which was named for C. B. McManus, president of the Southern Company and former president of Georgia Power Company, went into operation in November of 1952.

The present installation consists of one unit with a nameplate rating of 40,000 kw, AIEE-ASME preferred standard unit operating at steam conditions of 850 psig and 900 F. However, the plant is designed for an ultimate capacity of four 40,000 kw units.

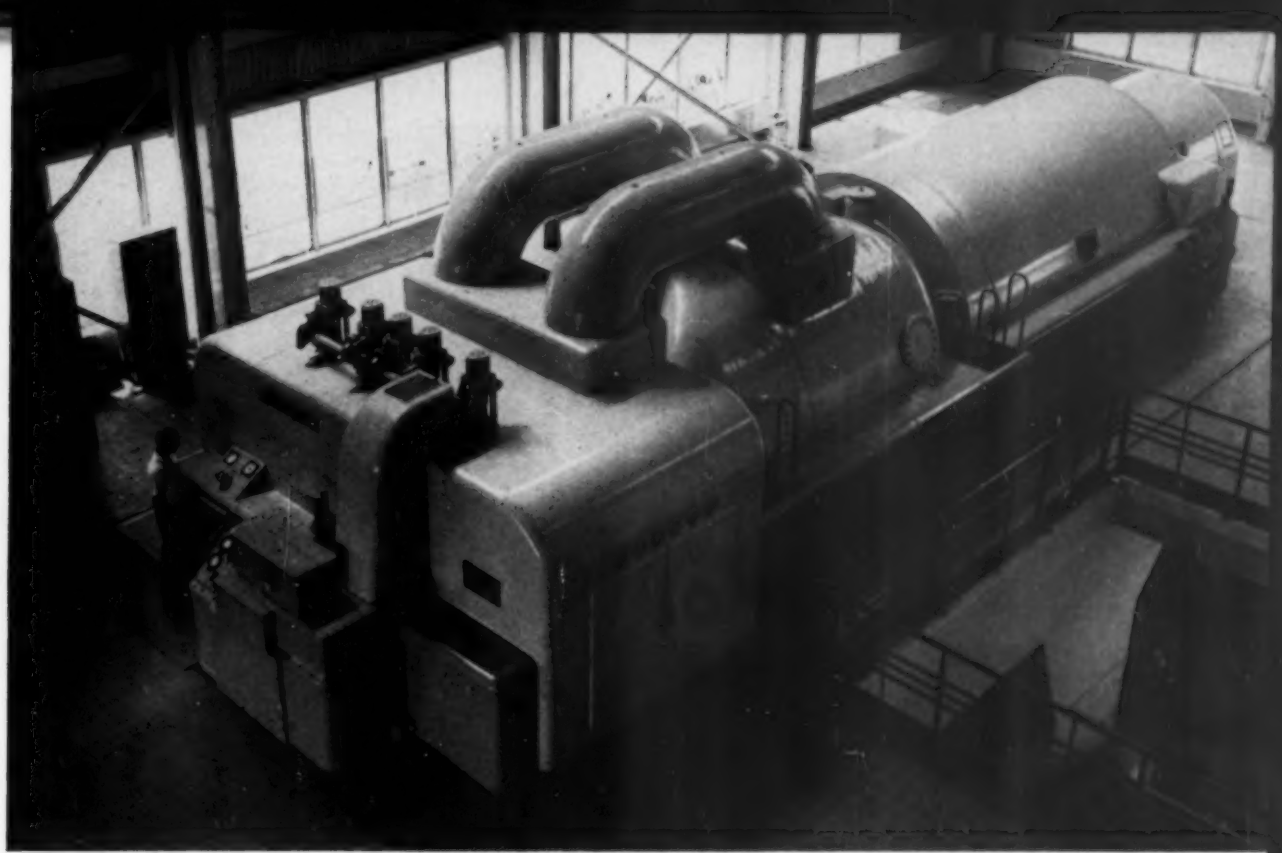
Up until the time Plant McManus went into operation, southeast Georgia's electrical needs were met by one 110 kv high line from Macon, some 200 miles north, and two small steam plants at Brunswick. The plant is the first modern high pressure unit on the company's system to be fired with heavy fuel oil.

The main building houses the boiler and turbo-generator as well as their auxiliaries, with the exception of the fuel oil pumps and heaters, induced draft fan, deaerator, and miscellaneous storage tanks, which are not under cover.

The main building is of structural steel with transite siding, erected on a concrete slab over concrete piling. The office annex, on the front of the building facing the river, is of red brick, and houses the administration offices, laboratory, wash and locker rooms, assembly room, machine shop and storerooms. Fluorescent lighting is used throughout the building.

### Condensing Water Structures

Condenser cooling water is obtained from the Turtle River



**Above—Allis-Chalmers 40,000 kw turbine-generator.**

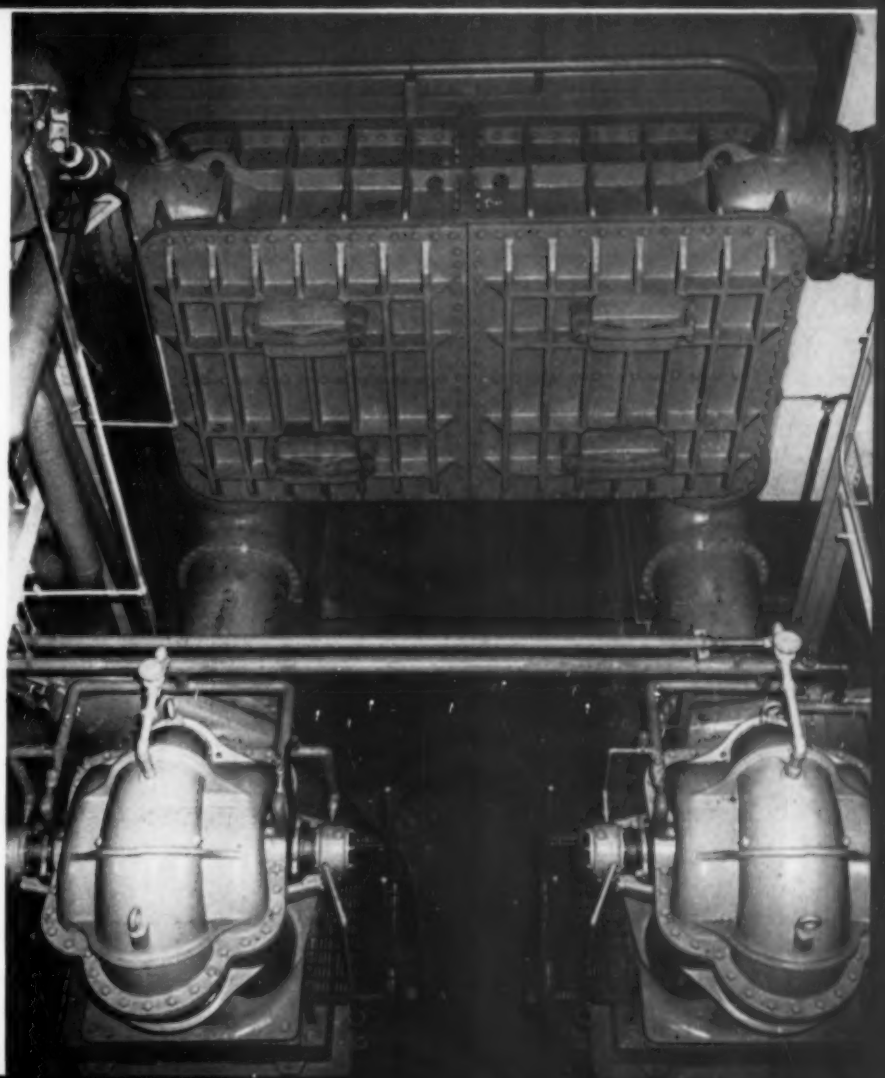
through a canal to traveling grate screens, and then through a concrete tunnel under the base slab to the circulating pumps. The discharge tunnel empties into another canal which returns to the river several hundred yards downstream from the intake canal, so there is no possibility of recirculation.

### Turbo-Generators

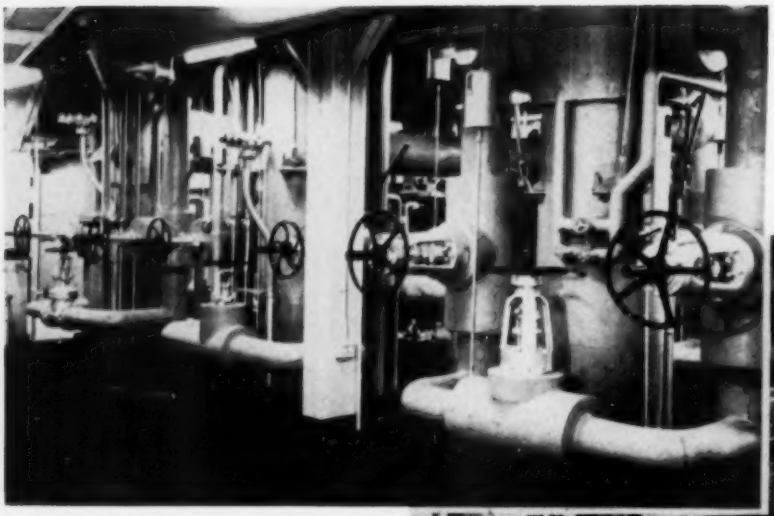
One Allis-Chalmers, tandem compound, double flow, 3600 rpm unit with 40,000 kw nameplate rating is installed at present. However, the plant is designed for future installation of three more similar units.

The turbine is supplied with steam at 850 psig, 900 F total temperature, and is designed for five stages of feedwater heating. The sixteenth stage extraction nozzle is also used for the evaporator.

The turbine exhausts into a horizontal, two pass, divided water box condenser, which is provided with

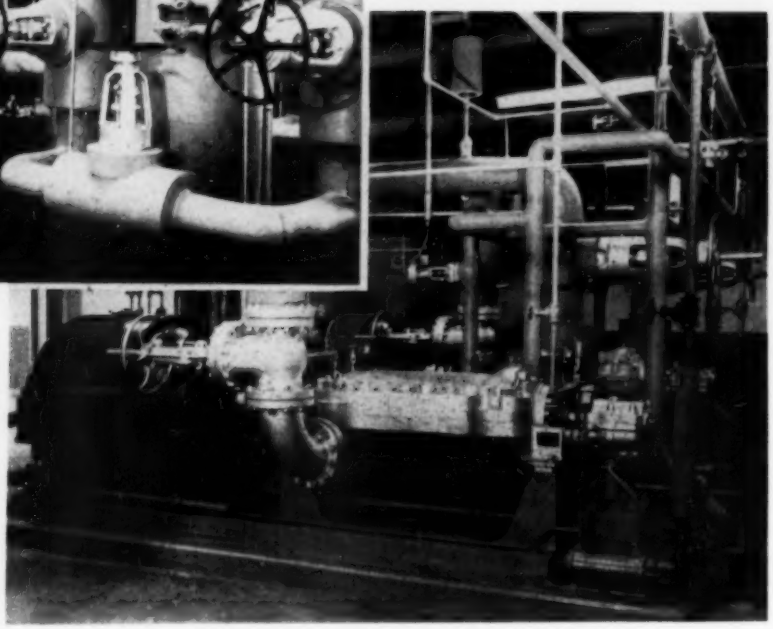


**Right—Ingersoll-Rand two-pass, divided water box condenser.**



Left—general view of heater floor showing three of the four closed feedwater heaters and connecting piping.

Below—Ingersoll-Rand boiler feed pumps, 8 stage, 1025 gpm, 2975 ft. Motors, 2300 v, 900 hp, 3570 rpm, Allis-Chalmers.



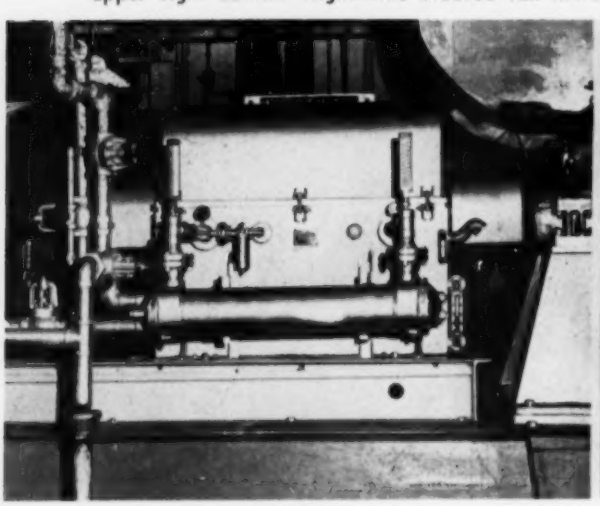
cooling water by two single stage, horizontal centrifugal pumps.

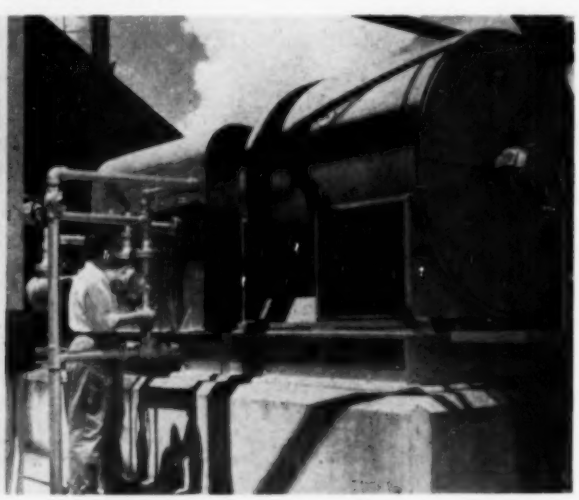
The generator is hydrogen cooled and has a nameplate rating of 40,000 kw at 0.85 power factor and 0.5 psig hydrogen pressure. It is designed for 30 psig maximum hydrogen pressure, 13,800 volts, 3 phase, 60 cycle service. The main exciter is direct connected, and the excitation voltage is regulated by a "Regulex" motor-generator set controlled from the 13 kv bus voltage.

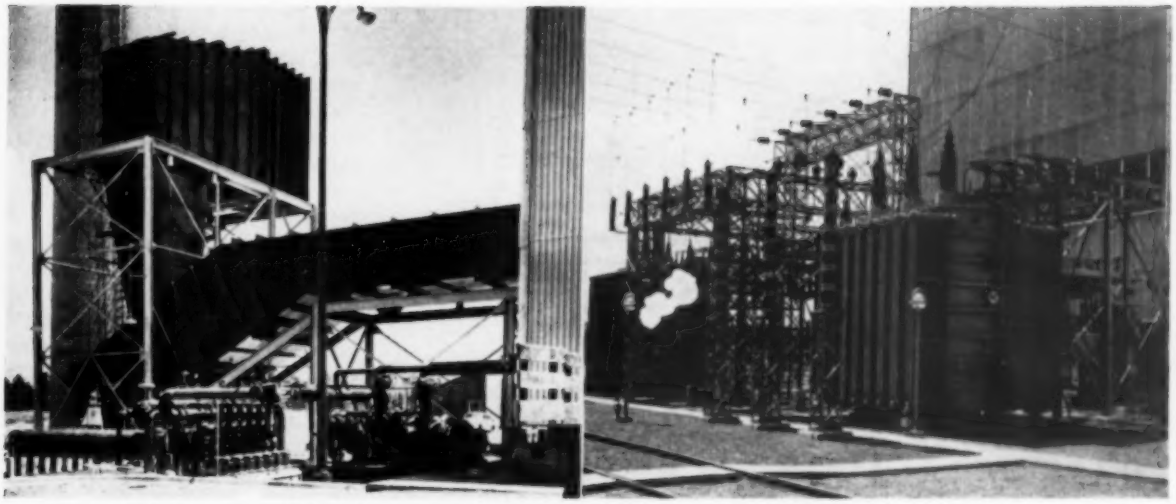
### Boiler

One Babcock and Wilcox single drum, radiant type, water tube boiler with a maximum capacity of 425,000 pounds per hour supplies steam to the turbine. The superheater is of the pendant, continuous tube, counter flow type and is provided with a by-pass section with damper for superheat temperature control. This control is manually operated and is supplemented by a recirculating gas fan and damper for light load conditions. This fan takes its suction between the economizer outlet and air heater inlet,

Left—American Blower Co. variable speed, movable scoop tube, fluid drive on forced draft fan. Oil cooler and associated piping on front side. Hot air recirculating duct to suction of fan in upper right corner. Right—the induced fan motor and fluid drive.







Left—high pressure fuel oil heaters and pumps in foreground. Induced draft fan, breeching, ductwork, and stack in background. Right—three phase power transformers, 20,000/25,000 kva.

and discharges to the bottom of the furnace.

The boiler is also equipped with a continuous tube, counterflow economizer, and an Air Preheater Corp., Ljungstrom regenerative type air heater.

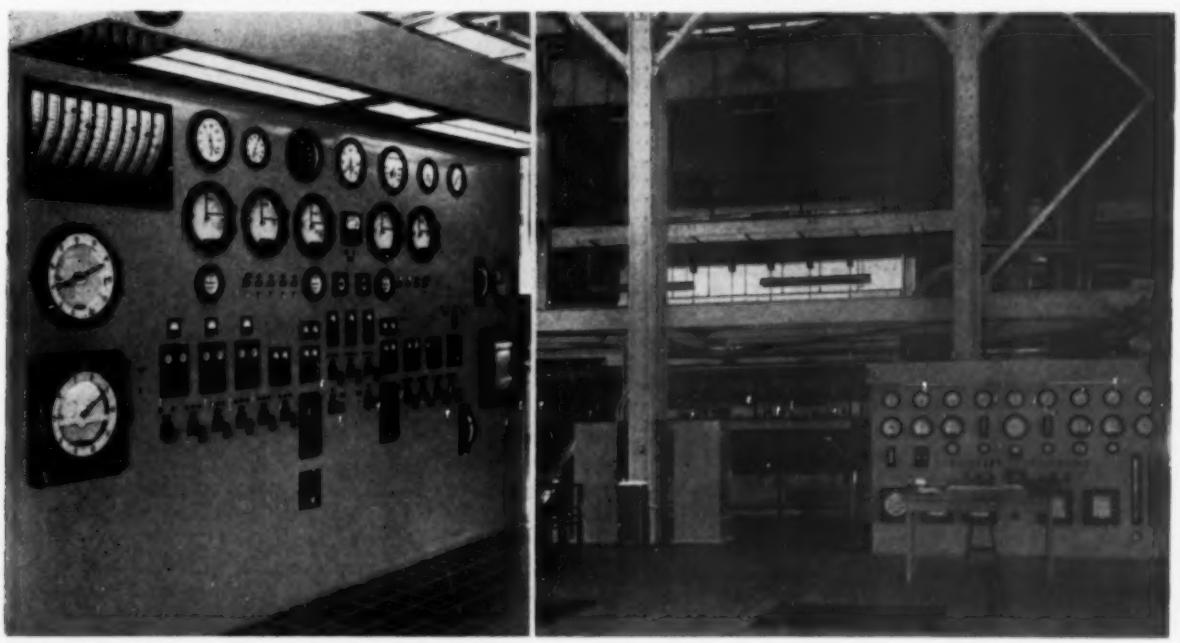
Manually operated soot blowers are provided for the superheater, superheater by-pass section, and economizer, with saturated steam as a blowing medium. The air heater has an electric driven blower using superheated steam as a blowing medium, and an electric driven cleaning device for washing with a high pH water-soda ash mixture.

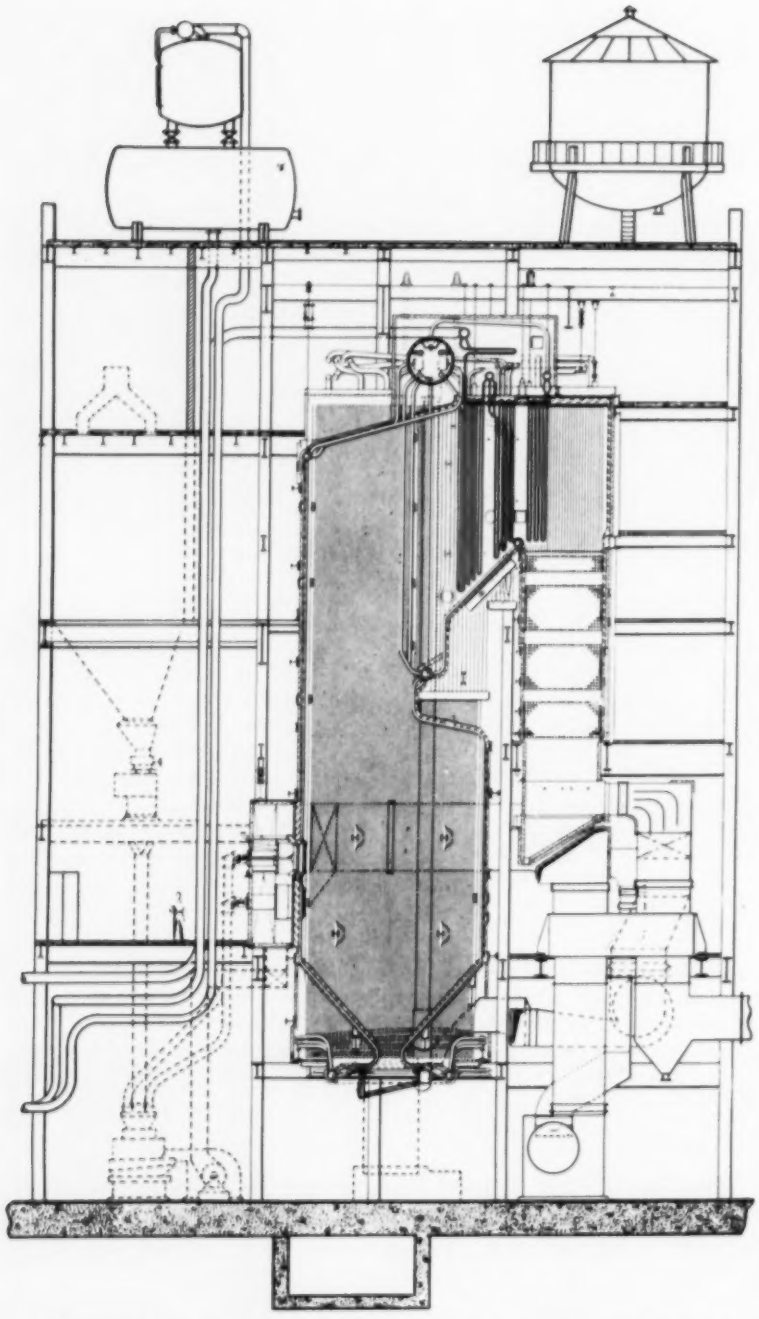
### Combustion Controls

The combustion control system is of the electronic type, manufactured by Republic Flow Meters Co. It is a relatively new development and is the first of its type installed by the Georgia Power Company. The regulators and positioners are of the standard air operated type, but transmission to and from the control panel is electrical.

The system receives its initial impulse from the main steam line pressure through the master controller which establishes an electric loading proportional to boiler load. This loading is transmitted through a bias ratio and electronic

Left—boiler control board. Right—general view taken from turbine room looking into boiler room, showing front of boiler. The six burners are shown at the left center background, with the turbine control board in the right center foreground. Boiler control panel is back of the turbine board.





Sectional view of Babcock and Wilcox boiler, 425,000 pounds per hour, 875 psig, 900 F.

amplifier to the oil flow regulator where it is balanced against a pneumatic loading which is representative of oil flow. The output of the oil flow regulator is then transmitted electrically to the receiving regulator positioning the oil supply valve.

The master loading is transmitted similarly through a bias ratio and amplifier to the air flow regulator where it is balanced against a pneumatic signal representative of air flow. The output of the air flow regulator then is transmitted electrically to the receiving regulator which positions the scoop tube on the forced draft fan hydraulic coupling.

Air flow, ordinarily one of the most difficult variables to measure on a modern boiler, is being measured with rather promising success by a segmental orifice in the air duct between the air preheater and the wind box. An orifice is installed on each side of the boiler and the flows are totalized pneumatically.

Furnace draft is controlled by an air actuated regulator which transmits an electrical loading to the receiving regulator which controls the position of the scoop tube on the induced draft fan hydraulic coupling. This control is entirely isolated from the other combustion controls.

Return oil flow is controlled by a differential pressure regulator which is loaded pneumatically by two pressure transmitters, one on the supply oil and one on the return oil. Thus the differential pressure across the burners is kept at the optimum value for the load on the boiler. This control is entirely pneumatic.

Feedwater flow is regulated by a Republic three-element, air operated system, which positions a cylinder operated feed valve.

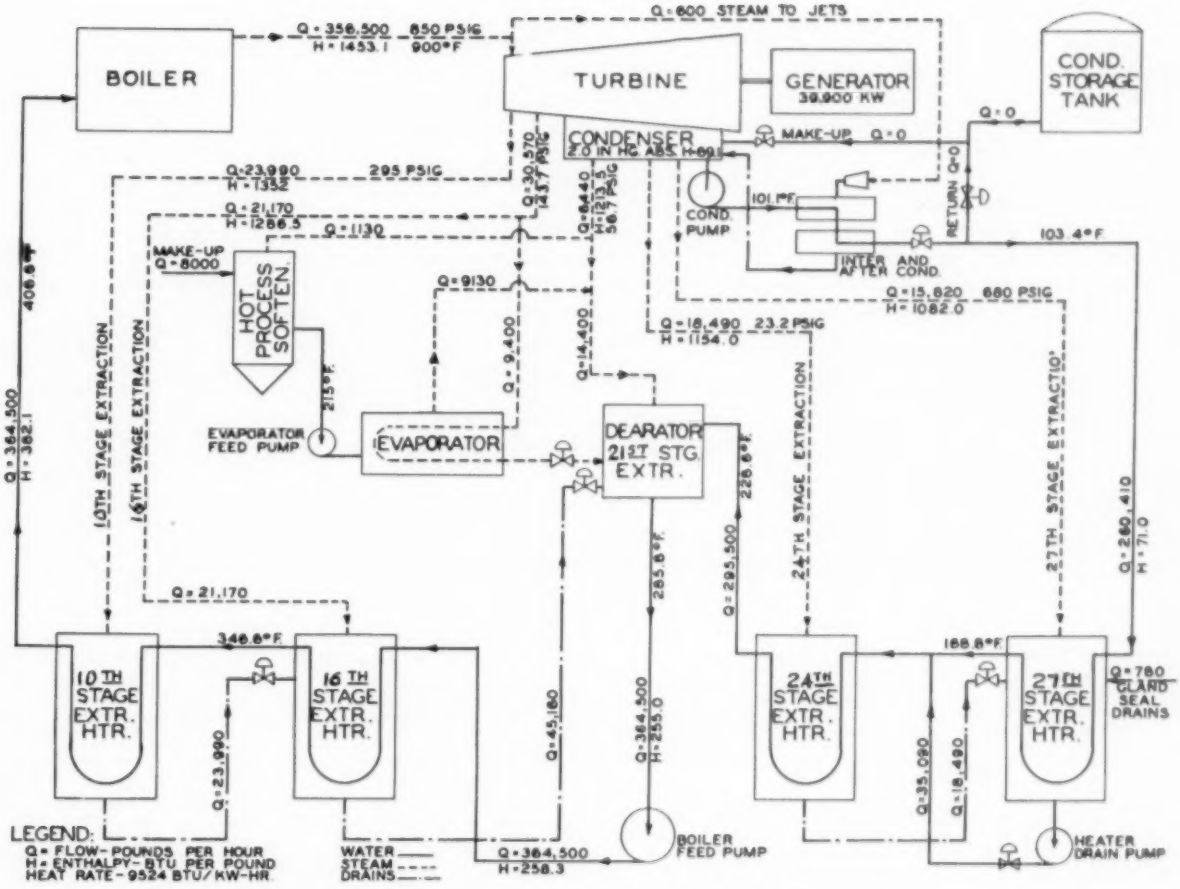
An electronic maximum and minimum control is also provided in conjunction with the boiler master loading control.

All controls lock in position on failure of the electronic amplifiers, and are arranged for manual operation from the control panel. Fan dampers, air heater recirculating dampers, and superheat control dampers are all manually operated from the panel.

Control panels for the boiler and turbine are placed back to back in the aisle between the present unit and the future second unit, and those for No. 2 unit will be alongside the ones now in place. The boards are not enclosed and are provided with integral canopy lighting.

### Fuel Burning Equipment

Heavy fuel oil (No. 6) is brought in by barge and stored in three 75,000 barrel storage tanks. Each tank is equipped with an oil heater from which the low pressure pumps take suction. These pumps discharge at a constant pressure to the high pressure oil heaters and




HEAT FLOW DIAGRAM, PLANT McMANUS, BRUNSWICK, GEORGIA

burner pumps. The burner pumps in turn discharge at a constant pressure to the oil supply valve which is positioned by the combustion control equipment.

The boiler is equipped with six mechanical atomizing return flow oil burners with return oil recirculated to the suction of the high pressure heaters. A relatively constant differential pressure is maintained across the burners by means of the return flow regulating valve which is positioned from the combustion control system. Pump discharge pressures are regulated by Fisher Governor Co. throttle valves controlled by an air operated proportional pilot.

Steam for oil heating and barge unloading is obtained from the boiler drum through a reducing station. Condensate from the heaters is recovered and returned to the storage tank.

The boiler is fed by either of two Ingersoll-Rand 1025 gpm, 3570 rpm, constant speed, eight stage, horizontally split casing centrifugal pumps. The pumps feed through a Republic air cylinder operated regulating valve, and are equipped with Republic automatic minimum flow hand reset valves. These valves open when the flow through the pump drops below 150 gpm and by-pass enough water to the deaerator to keep the pumps from overheating at low loads.

Condensate from the condenser hotwell is pumped through the inter and after condensers of the condenser air ejectors and two low pressure extraction heaters to a tray-type deaerating heater located on the boiler room roof, and then into a storage tank directly below. The boiler feed pumps take suction from the storage tank and discharge through two high pressure heaters to the economizer.

All heater drains are controlled by float type air pilot operated throttle valves, and flash to the next lower pressure heater. One drain pump is used on the 27th stage heater to pump the drainage back to the condensate line on the discharge side of the heater.

Since this plant is located on brackish, tidal waters, it was necessary to use a deep well for make-up purposes. This water is sent through a lime-soda ash hot process deaerating softener for pretreatment before entering the evaporator. The evaporator is a single effect, horizontal, bowed U-tube, submerged bundle type, capable of evaporating 15,000 pounds per hour.

### Electrical Equipment

An electrical control room separated from the boiler and turbine panels houses the generator and switchyard control panels. All necessary instruments, switches and

relays for control of the generator output and five transmission lines are provided on two panel boards. Two 110,000 kv lines, and three 44,000 kv lines radiate from the plant to join the inter-connected system.

The two main transformers are Allis-Chalmers Mfg. Co., three phase, circular coil shell type, oil and air cooled, with a capacity of 28,750 kva with forced air cooling.

### Station Service

Station service power is provided at 2300 volts, 575 volts, and 208 volts.

The 2300 volt switchgear consists of ten 1200 ampere metal clad air circuit breakers, and the 575 volt gear is in two sections with 39—600 ampere metal clad air circuit breakers.

The motors in the power house are of the open drip-proof type with those above 100 hp connected to 2300 volt service, those between 1 and 100 hp on the 575 volt circuit, and those rated below 1 hp on 208 volt service.

### Fire Protection

Fires in metal enclosed switchgear are sometimes very difficult to extinguish, so this plant is equipped with permanently installed $CO_2$ fire protective equipment for the 2300 volt and 575 volt cubicles. This equipment is similar to that provided at some of the other new plants on the Southern Co. system, consisting of a number of cylinders piped to the individual switchgear compartments and arranged for simultaneous release from a remote location. Hose reels are also provided for supplemental protection. Hand extinguishers of the $CO_2$ and dry powder types are placed about the plant at stategic points for quick access if necessary.

## PRINCIPAL EQUIPMENT—Plant McManus, Georgia Power Company, Brunswick, Georgia

#### GENERAL DATA

**Name of Station**.....Plant McManus
**Station Site**.....Brunswick, Georgia
**Cooling Water Source**.....Turtle River
**Design Engineers**.....Southern Services, Inc.

#### TURBINE-GENERATORS

**Turbine**.....One—Allis-Chalmers Mfg. Co., 40,000 kw nameplate rating, 3600 rpm, tandem compound, double flow, 29 stage, AIEE-ASME standard condensing, 850 psig, 900 F throttle conditions.
**Generator**.....One-Allis-Chalmers Mfg. Co., 3600 rpm hydrogen cooled, 40,000 kw, 47,058 kva rating at 0.5 psig hydrogen pressure, 58,823 kva at 30 psig hydrogen pressure, 0.85 pf, 13,800 volts, 3 phase, 60 cycle.
**Main Exciter**.....One—Allis-Chalmers Mfg. Co., 125 kw, 250 volts, 3600 rpm shunt wound, direct connected to generator.
**"Regulex" Generator**.....One—Allis-Chalmers Mfg. Co., 5 kw, 250 volt d-c, 1750 rpm.
**"Regulex" Motor**.....One—Allis-Chalmers Mfg. Co., induction motor, 10 hp, 550 volt, 1740 rpm, 60 cycle.
**Generator Hydrogen Coolers**.....Four—Griscom-Russell Co., single element surface type. Aluminum brass tubes. Supply hydrogen to generator at 104 F with 400 gpm of 90 F water.
**Turbine Oil Coolers**.....Two—Ross Heater Mfg. Co., twin coolers of straight tube cylindrical type. Aluminum brass tubes. Two water passes, one oil pass. Cool oil sufficiently with 300 gpm of 95 F water.
**Turbine Oil Filter**.....One—Bowser, Inc., capacity 270-540 gph.

#### CONDENSING EQUIPMENT

**Surface Condensers**.....One — Ingersoll-Rand, horizontal, two pass, divided water box, 33,850 sq ft cooling surface. Aluminum brass tubes.
**Circulating Water Pumps**.....Two—Ingersoll-Rand, single stage horizontal centrifugal, 17,175 gpm, 90 F salt water at 25 ft total head at 288 rpm.
**Circulating Pump Drives**.....Two—Allis-Chalmers Mfg. Co., induction motors 150 hp, 288 rpm, 2300 volts, 3 phase, 60 cycle.
**Air Ejector**.....Ingersoll-Rand steam jet ejector, two stage, twin element, with inter and after condenser.

#### STEAM GENERATING EQUIPMENT

**Boilers**.....One—Babcock & Wilcox Co., single drum, bent tube, radiant type. 425,000 lb/hr maximum continuous rating, 875 psig, 900 F at superheater outlet. Boiler design pressure 1046 psig. Boiler surface—2965 sq ft, drums 60 in. diameter, 33 ft 9 in. long.
**Superheater**.....One—Babcock & Wilcox Co., continuous tube counter flow pendant type, 11,990 sq ft, 900 F.
**Furnace**.....One—Babcock & Wilcox Co., water wall, hopper bottom, water wall surface—4828 sq ft.
**Economizer**.....Continuous tube, counter flow, 18,279 sq ft heating surface.
**Air Preheater**.....One—Air Preheater Corp., Ljungstrom Regenerative. 37,300 sq ft heating surface.
**Soot Blowers**.....Diamond Power Specialty Corp., manual operation, saturated steam blow. Superheater—5 IK; Superheater by-pass—3 IS; Economizer—16 G9B; Air Heater—1 electric drive, superheated steam blow.
**Combustion Control**.....Republic Flow Meters Co., air operated regulators, electronic transmission.
**Feedwater Flow and Drum Level**..Republic Flow Meters Co, three-element, air operated. Republic direct cylinder operated valve.
**Superheat Temperature Control**..Bailey Meter Co., manual with superheater by-pass damper. Recirculating gas fan with damper for low loads.
**Gas Recirculating Fan**.....One—American Blower Corp., type MS 126,000 lb/hr, capacity at 2.8 in. water static pressure, 380 F.
**Gas Recirculating Fan Drive**.....One—Allis-Chalmers Mfg. Co., drip proof motor, 75 hp, 550 volt, 3 phase, 60 cycle, 900 rpm.
**Safety Valves**.....Four—Crosby Steam Gage & Valve Co., nozzle type; one on superheater, three on drum.
**Water Columns**.....One — Diamond Power Specialty Corp., bi-color. One—Yarnall-Waring Co.

#### FUEL BURNING EQUIPMENT

**Burners**.....Six—Babcock & Wilcox Co., mechanical atomizing, return flow oil burners. Designed for future installation of pulverized coal and natural gas.
**Fuel Oil Booster Pumps**.....Two—DeLaval Steam Turbine Co., type IMO rotary screw type, 110 gpm of 800 SSU fuel oil at 200 psig discharge pressure and 0 psig suction pressure, 1150 rpm. Drive motor Allis-Chalmers Mfg. Co. 30 hp, 1170 rpm, 550 volt, 3 phase, 60 cycle totally enclosed fan cooled squirrel cage induction motor.
**Fuel Oil Burner Pumps**.....Two—DeLaval Steam Turbine Co., type IMO rotary screw type, 95 gpm of 100 SSU fuel oil at 1100 psig discharge pressure, 125 psig suction pressure, 1750 rpm. Drive motor Allis-Chalmers Mfg. Co. 100 hp, 1775 rpm 550 volt, 3 phase, 60 cycle totally enclosed fan cooled squirrel cage induction motor.
**Fuel Oil Suction Heaters**.....Three—Griscom-Russell Co. (one on each fuel oil storage tank). G-fin type, 1910 sq ft of heating surface each. Heat 325 gpm fuel oil from 50 F to 125 F with 6700 lb of steam at 150 psig and 320 F.
**High Pressure Fuel Oil Heaters**..Fourteen—Griscom-Russell Co., G-fin type arranged in seven parallel banks with two heaters in series in each bank. 10,018 sq ft heating surface each. Heat fuel oil from 125 F to 250 F at 150 psig with steam at 75 psig and 320 F.
**Lighter Oil Pumps**.....Two—DeLaval Steam Turbine Co. centrifugal .25 gpm at 1800 rpm. Driven by General Electric Co. triclad induction motor, 15 hp, 550 volt, 3 phase, 60 cycle.

#### DRAFT EQUIPMENT

**Forced Draft Fan**.....One—Sturtevant Division of Westinghouse Electric Corp. Double inlet, double width turbovane, 167,500 cfm of 140 F air at positive static pressure of 12.5 in. of water.
**Forced Draft Fan Fluid Drive**....One—American Blower Corp., type VS Gyrol variable speed fluid drive controlled by adjustable scoop tube, 860 rpm.
**Forced Draft Fan Motor**.....One—Allis-Chalmers Mfg. Co., 400 hp induction motor, 880 rpm, 2300 volt, 3 phase, 60 cycle.
**Induced Draft Fan**.....One—Sturtevant Division of Westinghouse Electric Corp. Double inlet, double width, 255,000 cfm of 340 F flue gas at a negative static pressure of 15.5 in. water, 685 rpm.

**Induced Draft Fan Fluid Drive**...One—American Blower Corp., type VS Gyrol variable speed fluid drive controlled by adjustable scoop tube.
**Induced Draft Fan Motor**.....One—Allis-Chalmers Mfg. Co., 900 hp induction motor, 705 rpm, 2300 volt, 3 phase, 60 cycle.
**Stack**.....Rust Engineering Co., radial brick, 165 ft high, 13 ft 6 in. top inside diameter.
**Duct Work**.....Birmingham Fabricating Company

## BOILER FEEDWATER SYSTEM

**Condensate Pumps**.....Two—Ingersoll-Rand three stage four impeller centrifugal, 700 gpm of 109 F water at 375 ft TDH, 1175 rpm.
**Condensate Pump Drives**.....Two—Allis-Chalmers Mfg. Co., 125 hp tube-type TEFC induction motor, 1170 rpm, 2300 volt, 3 phase, 60 cycle.
**Closed Heaters**.....Four — Westinghouse Electric Corp., vertical, 2 pass, U-tube. 10th Stage Extraction—1140 sq ft heat exchange surface; 16 Stage Extraction—1330 sq ft heat exchange surface; 24th Stage Extraction—1320 sq ft heat exchange surface; 27th Stage Extraction—1450 sq ft heat exchange surface.
**Deaerating Heater, 21st Stage Extraction**.....One—Elliott Company, direct contact, tray type, 425,000 lb/hr capacity at 90 psia, with 70,000 lb storage tank below.
**Evaporator**.....One—Westinghouse Electric Corp., horizontal, submerged bundle, bowed U-tube, thermal descaling, 400 sq ft, 15,000 lb/hr. Maximum working pressure—shell 75 psig, tubes 250 psig.
**Evaporator Feed Pumps**.....Two — Ingersoll-Rand two stage, volute type centrifugal, 35 gpm, 3450 rpm, driven by Allis-Chalmers Mfg. Co. induction motor, 3 hp, 3600 rpm, 550 volt, 3 phase, 60 cycle.
**Boiler Feed Pumps**.....Two — Ingersoll-Rand, 8 stage, horizontally split casing, diffusor type centrifugal, 1025 gpm, 3570 rpm, 2795 ft TDH. Driven by 900 hp Allis-Chalmers Mfg. Co. induction motor, 3575 rpm, 2300 volts, 3 phase, 60 cycle.
**Heater Drain Pump**.....One — Worthington Corporation, single stage centrifugal, 95 gpm, 3540 rpm, 345 ft TDH. Driven by 25 hp Allis-Chalmers Mfg. Co. induction motor, 3550 rpm, 550 volts, 3 phase, 60 cycle.

## WATER TREATING PLANT

**Softener**.....One—Cochrane Corp., deaerating, hot process, 60 gpm.
**Filters**.....Three — Cochrane Corp., graded anthracite filtering, 30 gpm each.

## PIPING AND VALVES

**Piping Contractor**.....Grinnell Co., Inc.
**Covering Contractor**.....North Brothers
**Covering Material**.....High temperature or 85% Magnesia, canvas covered.
**Check Valves**.....Chapman Valve Mfg. Co., Ohio Injector Co., Hancock Valve Div. of Manning, Maxwell & Moore, Inc.
**Gate and Globe Valves**.....Hancock Valve Div. of Manning, Maxwell & Moore, Inc., Chapman Valve Mfg. Co.
**Small Valves**.....Hancock Valve Div. of Manning, Maxwell & Moore, Inc., Ohio Injector Co. Inc., Edward Valves, Inc., Jenkins Brothers, Crane Co., Lukenheimer Valve Co.
**Pressure Reducing Valves**.....Fisher Governor Co.
**Fuel Oil Regulating Valves**.....Fisher Governor Co.
**Float Chambers and Floats**.....Fisher Governor Co.
**Drainers on Feedwater Heaters**..Fisher Governor Co.
**Boiler Feed Pump Minimum Flow Valves**.....Republic Flow Meters Co.
**Feedwater Valve**.....Republic Flow Meters Co., air cylinder operated.
**Blow Off Valves**.....Hancock Valve Div. of Manning, Maxwell & Moore, Inc.
**Main Steam Valve**.....Chapman Valve Mfg. Co., motor operated.
**Circulating Water Valves**.....Two—Chapman Valve Mfg. Co., motor operated.
**Traps**.....Armstrong Machine Works

## INSTRUMENTS

**Flow Meters**.....Republic Flow Meters Co., electric on steam, feedwater and condensate flows. Pneumatic-electric on fuel oil flow. Pneumatic on air flow.
**Drum Level Recorder**.....Republic Flow Meters Co., electric
**Drum Level Indicator**.....Yarnall-Waring Co.
**Miscellaneous Tank Level Indicators**..Yarnall-Waring Co.
**Draft Gauges**.....Republic Flow Meters Co., 9-unit, vertical scale, dry diaphragm.
**Pressure and Vacuum Gauges**.....Indicating — Ashcroft; Manning, Maxwell & Moore, Inc. Recording—Republic Flow Meters Co., The Foxboro Co.
**Thermometers**.....Recording—Leeds & Northrup Co., Republic Flow Meters Co., Penn Industrial Instrument Co.. Indicating—American; Manning, Maxwell & Moore, Inc.
**Mercury Columns**.....American; Manning, Maxwell & Moore, Inc.
**Barometer**.....American; Manning, Maxwell & Moore, Inc.
**Conductivity Recorders**.....Leeds & Northrup Co., condensate, evaporator vapor, and saturated steam.
**Flue Gas $CO_2$ Recorder**.....Leeds & Northrup Co.
**Load and Voltage Recorder**.....Esterline-Angus Co.
**Frequency Recorder**.....Esterline-Angus Co.
**Switch Operation Recorder**.....Esterline-Angus Co.

## ELECTRICAL EQUIPMENT

**Main Transformers**.....Two—Allis-Chalmers Mfg. Co., 3 phase, 6 cular coil shell type, oil and air cooled. Capacity 23,000 kva self cooled, 28,750 kva forced air cooled, 13.2/110 kv.
**Station Service Transformers**.....Two—Allis-Chalmers Mfg. Co., 3 phase, 60 cycle, 3000 kva, 13.8 v/2300 v/575 v. Three—Molonex Co., 208 volt.
**Oil Circuit Breakers**.....Two—Allis-Chalmers Mfg. Co., 3 phase, 115 kv, 1200 amp, 60 cycle; one—Westinghouse Electric Corp., 3 phase, 14.4 kv, 300 amp; three—Westinghouse Electric Corp., 3 phase, 46 kv, 600 amp.
**Switchgear**.....Westinghouse Electric Corp., 2300 volt station service; metal clad with ten 1200 amp air circuit breakers. General Electric Co.—575 volt station service, two sections, metal clad with 39,600 amp air circuit breakers. Westinghouse Electric Corp.—208 volt station service.
**Storage Battery**.....Electric Storage Battery Co., 60 cell Oxide Manchex.
**Battery Charger**.....Electric Products Co., 5 kw, 140/129 volts d-c diverter pole motor generator set. Driven by 7½ hp, 1800 rpm, 550 volt, 3 phase, 60 cycle squirrel cage induction motor.
**Emergency Generator**.....United States Motors Corp., gasoline engine driven, 100 kw, 600 volt, 1800 rpm, 3 phase, 60 cycle.
**Electric Indicating Instruments**...Weston Electric Corp.
**Relays**.....Westinghouse Electric Corp., General Electric Co.
**Fire Protection Equipment**.....C-O-Two Fire Equipment Co.

## MISCELLANEOUS EQUIPMENT

**House Service Pumps**.....Two—Ingersoll-Rand single stage centrifugal, 1250 gpm, 1770 rpm, 190 ft TDH. Driven by Allis-Chalmers Mfg. Co. induction motor, 75 hp, 1750 rpm, 550 volt, 3 phase, 60 cycle.
**Cooling Water Pumps**.....One—Ingersoll-Rand, single stage centrifugal, 1000 gpm, 1765 rpm, 125 ft TDH. Driven by Allis-Chalmers Mfg. Co. induction motor, 40 hp, 1750 rpm, 550 volt, 3 phase, 60 cycle.
**Screen Wash Pump**.....One—Ingersoll-Rand, single stage centrifugal, 55 gpm, 3530 rpm, 270 ft TDH. Driven by Allis-Chalmers Mfg. Co. induction motor, 50 hp, 3550 rpm, 550 volt, 3 phase, 60 cycle.
**Control Air Compressor**.....One — Worthington Corp., single cylinder, capacity 153.5 cfm of free air at 100 psig. Driven by Allis-Chalmers Mfg. Co. induction motor, 30 hp, 1750 rpm, 550 volts, 3 phase, 60 cycle, Multi-V-belt drive.
**Air Compressor**.....One — Worthington Corp., single cylinder, capacity 313 cfm of free air at 100 psig. Driven by Allis-Chalmers Mfg. Co. induction motor, 60 hp, 1165 rpm, 550 volt, 3 phase, 60 cycle, Multi-V-belt drive.
**Intake Screens**.....Chain Belt Co., Rex traveling screen, driven by Louis Allis Co. motor, 3 hp, 1765 rpm, 550 volt, 3 phase, 60 cycle, through a Falk Corp., speed reducer.
**Turbin Room Crane**.....One — Whiting Corp., 100 ton (main), 15 ton (auxiliary).
**Deep Well Pumps**.....Two—Weinman Pump Mfg. Co., single stage centrifugal, 250 gpm, 1750 rpm, 135 ft TDH. Driven by Marble Card Electric Co. motor, 15 hp, 1750 rpm.
**Sump Pumps**.....Two—Goulds Pumps, Inc., duplex assembly with two vertical centrifugal pumps. Capacity 500 gpm each at 32 ft TDH. Driven by General Electric Co. 7½ hp, 1750 rpm, 550 volt, 3 phase, 60 cycle, drip proof squirrel cage induction motor.
**Chemical Feed Pumps**.....% Proportioneers, Inc.%, duplex. one—Worthington Corp., one—Milton Roy Co.
**Miscellaneous Pumps**.....Ingersoll-Rand, Worthington Corp.
**Vacuum Cleaning System**.....U. S. Hoffman Machinery Corp., centrifugal exhauster with secondary separator. Driven by 30 hp, 3500 rpm, 550 volt, 3 phase, 60 cycle, Allis-Chalmers induction motor.
**Elevator**.....General Elevator Co., 2000 lb capacity.
**Tanks**.....Chicago Bridge & Iron Co.: Three Fuel oil storage, 75,000 bbl capacity; one—Lighter oil storage, 15,000 gallon capacity; one—condensate storage, 60,000 gallon capacity; one—house service storage, 30,000 gallon capacity; one—turbine oil storage, two compartment, 6,000 gallon total capacity. Taylor Iron Works & Supply Co.: one—elevated sanitary water storage, 25,000 gallon capacity; General Steel Tank Co.: one—two compartment condensate recovery tank.
**Plant Phone System**.....Kellogg Switchboard & Supply Co.
**Sound Proof Booths**.....Burgess-Manning Co.
**Motor Drive Couplings**.....Fasts
**Expansion Joints**.....United States Rubber Co., circulating water pumps and condensate pumps.

***Pollution and disposal problem solved by Convair at Fort Worth . . .***

# Waste Water Treatment

**By F. C. CLAYTON** Chief Plant Engineer
Consolidated Vultee Aircraft Corporation, Fort Worth, Texas

REMEMBER the old ditty—"If you want to do something big and clean, go wash an elephant"? At Convair, Fort Worth, something far bigger is washed—a B-36 airplane. This is nothing particularly new, as B-36's have been washed at Air Bases and Maintenance Centers as well as at both the San Diego and Fort Worth Convair plants for years. The important feature of the operation reported here is the waste disposal system.

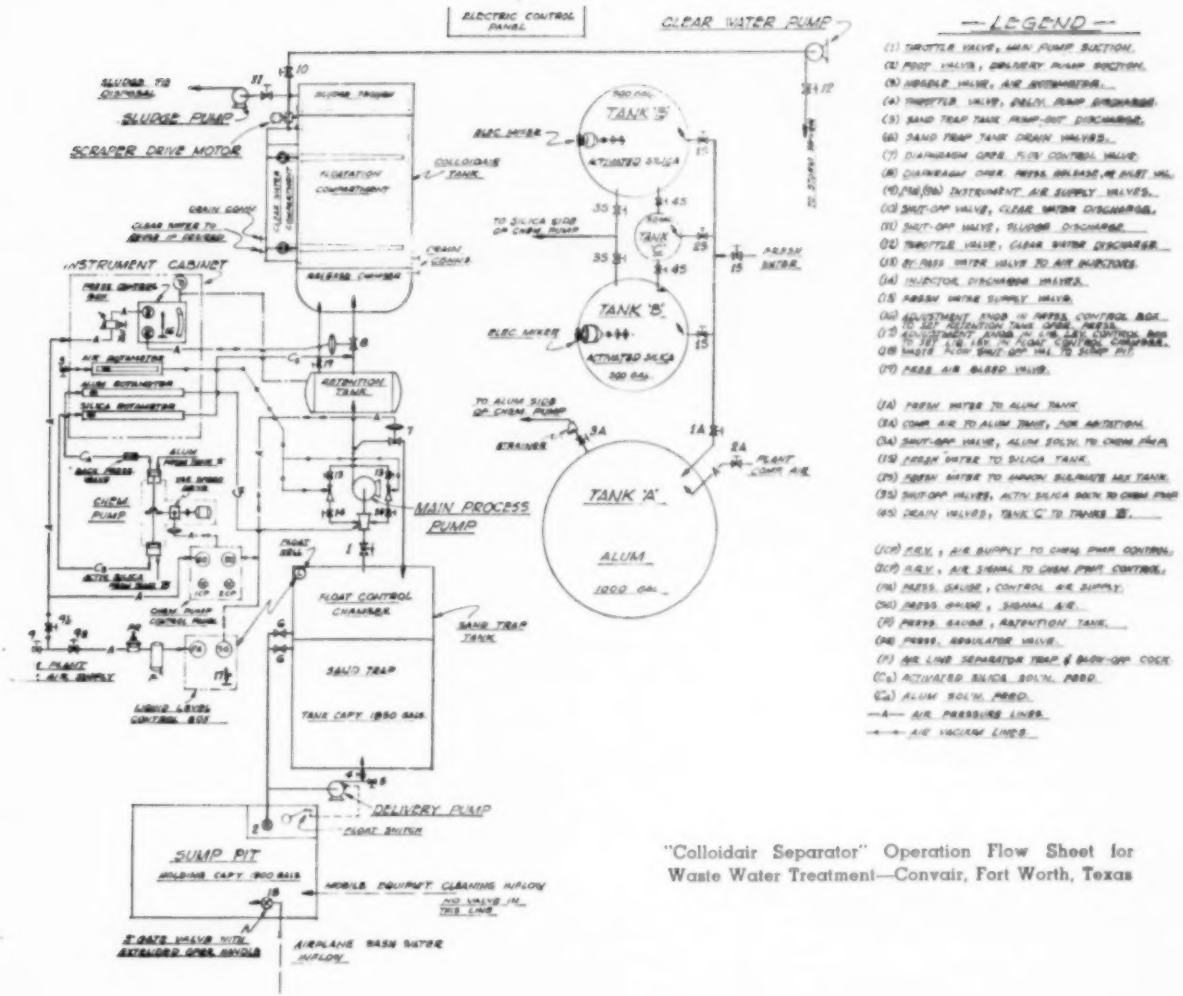
Convair has entered into a cyclic maintenance program with the Air Force under which B-36's will be returned to the factory periodically for maintenance and incorporation of changes as may be desired. One of the first operations, after removal of fuel and engines, is to completely clean the airplane. This is done with high pressure sprays of hot solution containing solvent and detergent and the resulting sludge or "gunk" causes a serious pollution and disposal problem. How Convair solved this problem may find application in many industrial plants and maintenance shops.

The system used is known as the "Colloidair System for Clarification of Aircraft Wash Wastes" (Dissolved Air Flotation Separators). This system was selected by Convair's Plant Engineering Department after study of all known methods which could be applied to the task under the conditions in existence, as most likely to produce satisfactory results with minimum investment and operating cost.

General view of the "Colloidair Separator" installation at Convair's Fort Worth, Texas, plant. Processing method solved a pollution and disposal problem.

## System Operation

Wastes from aircraft washing operations containing emulsified and free oils and greases, "gunk" cleaners, detergents, etc., are collected in a catch basin for treatment. A delivery pump, operated by a float controlled switch, delivers the liquid from a sump in the catch basin to the sand trap, a 2000 gallon rectangular tank,


ELECTRIC CONTROL PANEL
CLEAR WATER PUMP
SLUDGE TO DISPOSAL
SLUDGE PUMP
SCRAPER DRIVE MOTOR
FLOTATION COMPARTMENT
COLLOIDAIR TANK
CLEAR WATER CHAMBER
DRAIN CONDU
CLEAR WATER TO REUSE IF REQUIRED
INSTRUMENT CABINET
AIR ROTAMETER
ALUM ROTAMETER
SILICA ROTAMETER
RETENTION TANK
CHEM. PUMP
MAIN PROCESS PUMP
FLOAT CONTROL CHAMBER
SAND TRAP TANK
SAND TRAP
TANK CAPY. 1850 GALS.
LIQUID LEVEL CONTROL BOX
DELIVERY PUMP
FLOAT SWITCH
SUMP PIT
HOLDING CAPY. 1900 GALS.
MOBILE EQUIPMENT CLEANING INFLOW
NO VALVE IN THIS LINE
AIRPLANE WASH WATER INFLOW
TANK 'B'
ACTIVATED SILICA
200 GAL.
ELEC. MIXER
TO SILICA SIDE OF CHEM. PUMP
TANK 'C'
FRESH WATER
TANK 'A'
ALUM
1000 GAL.
TO ALUM SIDE OF CHEM. PUMP
STRAINER
PLANT COMP. AIR
LEGEND
(1) THROTTLE VALVE, MAIN PUMP SUCTION.
(2) FOOT VALVE, DELIVERY PUMP SUCTION.
(3) NEEDLE VALVE, AIR ROTAMETER.
(4) THROTTLE VALVE, MAIN PUMP DISCHARGE.
(5) SAND TRAP TANK PUMP-OUT DISCHARGE.
(6) SAND TRAP TANK DRAIN VALVES.
(7) DIAPHRAGM OPER. FLOW CONTROL VALVE.
(8) DIAPHRAGM OPER. PRESS. RELEASE OR BLEED VAL.
(9)(10)(9a) INSTRUMENT AIR SUPPLY VALVES.
(11) SHUT-OFF VALVE, CLEAR WATER DISCHARGE.
(12) SHUT-OFF VALVE, SLUDGE DISCHARGE.
(13) THROTTLE VALVE, CLEAR WATER DISCHARGE.
(14) BY-PASS WATER VALVE TO AIR INJECTORS.
(15) INJECTOR DISCHARGE VALVES.
(16) FRESH WATER SUPPLY VALVE.
(17) ADJUSTMENT KNOB IN PRESS. CONTROL BOX TO SET RETENTION TANK OPER. PRESS.
(18) ADJUSTMENT KNOB IN LIQ. LEV. CONTROL BOX TO SET LIQ. LEV. IN FLOAT CONTROL CHAMBER.
(19) WASTE FLOW SHUT-OFF VAL. TO SUMP PIT.
(20) PRESS. AIR BLEED VALVE.
(1A) FRESH WATER TO ALUM TANK.
(2A) COMP. AIR TO ALUM TANK, FOR AGITATION.
(3A) SHUT-OFF VALVE, ALUM SOLN. TO CHEM. PMP.
(15) FRESH WATER TO SILICA TANK.
(2S) FRESH WATER TO CARBON BISULFATE MIX TANK.
(3S) SHUT-OFF VALVES, ACTIV. SILICA SOLN. TO CHEM. PMP.
(4S) DRAIN VALVES, TANK 'C' TO TANKS 'B'.
(CCP) P.R.V., AIR SUPPLY TO CHEM. PMP. CONTROL.
(SCP) P.R.V., AIR SIGNAL TO CHEM. PMP. CONTROL.
(PA) PRESS. GAUGE, CONTROL AIR SUPPLY.
(PS) PRESS. GAUGE, SIGNAL AIR.
(PR) PRESS. GAUGE, RETENTION TANK.
(PR) PRESS. REGULATOR VALVE.
(F) AIR LINE SEPARATOR TRAP & BLOW-OFF COCK.
(Ca) ACTIVATED SILICA SOLN. FEED.
(Cb) ALUM SOLN. FEED.
—A— AIR PRESSURE LINES.
—V— AIR VACUUM LINES.

"Colloidair Separator" Operation Flow Sheet for Waste Water Treatment—Convair, Fort Worth, Texas

which (1) traps out the heavier suspended solids, (2) functions as a surge basin, (3) provides a chamber for liquid level (flow) control. Flow from sand trap proceeds through valve No. 1, thence through special "Colloidair" casting, through main process pump and into retention tank.

At this point note air injection circuit. Main process pump builds up flow pressure to 30-40 psi, forcing part of flow back through valve No. 13, through air injector (venturi), then through valve No. 14, and return into special "Colloidair" casting for dispersion back into main process flow. This method of forcing a small quantity of flow through the air aspirator causes a metered input of atmospheric air to enter through needle valve No. 3, then through air rotameter to suction entry of aspirator. There are two aspirators arranged in parallel.

Air-liquid mix then enters main process pump, is finely dispersed by impeller, and upon entering the retention tank, air is actually dissolved in the water under pressure. Flow from retention tank proceeds to flotation tank through inlet control valve No. 8, which allows pressure release of mix to atmosphere.

Oils, greases, and suspended solids have been chemically flocculated on arrival at this point, and upon release of pressure to atmosphere through inlet valve, very small air bubbles form in large quantity in and around the fluffy particles (flocculent) and buoy them to the surface in the flotation separator tank. The "floc" is thus concentrated in a floating layer, which is skimmed off the water surface by action of the scraper blades and delivered to the sludge collecting trough for subsequent removal and disposal. Clear water is gravity fed through draw-off tubes at the bottom of the flotation tank to a clear water chamber on the side of tank. From there the clarified water is delivered by a pump to the sewer, or to reuse, if desired.

Instrumentation and controls are provided for continuous and automatic operation of the system. In use it is necessary to properly prepare the chemicals, and the system is started and shut down manually. Residual concentrated sludge is collected in drums or truck and disposed of in a sanitary fill dump area. The effluent is currently routed to the sanitary sewer, but is suitable for re-use or drainage to the watershed.

***Southwestern Public Service Company's newest plant—Amherst, Texas***

# Operating Report—PLANT X

**By E. W. ROBINSON**
System Plant Engineer,
Southwestern Public Service Company,
Amarillo, Texas

THE FIRST UNIT of Southwestern Public Service Company's newest plant, near Amherst, Texas, went into commercial operation June 16, 1952.

Completion of the initial unit at Plant X, a 50,000 kw, 850 lb, 900 F turbo-generator, coincided with the beginning of installation of the second unit (100,000 kw, 1250 lb, 950 F) scheduled for operation in mid-1953.

A third unit for Plant X is now on the boards, with completion planned for mid-1955. The third unit will have a capability of 100,000 kw and will operate at 1450 lb, 1000 F with 1000 F reheat. These three units together with further additions planned through 1958, will make Plant X one of the largest generating stations in the Southwest.

"Plant X Preview"—pages 68 through 72, Southern Power & Industry for June, 1952—was also written by Mr. Robinson. That semi-technical description of design features covers turbine-generators; boiler feedwater equipment; instruments; electrical, steam-generating and condensing equipment, water treating plant, and piping and valves.

Mr. Robinson joined Southwestern Public Service Company in 1929 immediately after graduation from Texas University as an electrical engineer.

During early years of employment he worked successively as chemist, plant operator, results engineer, and plant manager. He became chief mechanical engineer in 1942 and shortly thereafter assumed his present position as system plant engineer. He heads up design and construction of all major mechanical and structural projects required by Southwestern. Rapid expansion of generating facilities requires most of his time on new power plant projects.

He is a registered professional engineer in Texas and New Mexico, and is a member of the AIEE and Texas Society of Professional Engineers.

### WHY PLANT X?

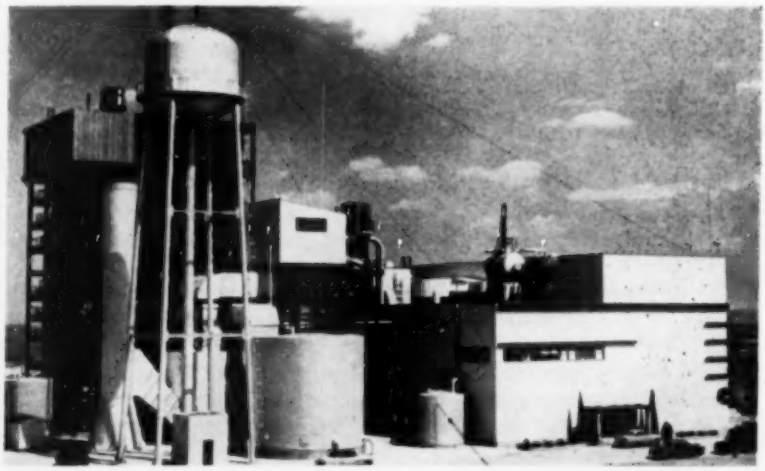
An abundance of well water, the availability of fuel gas, and system electrical characteristics were the factors influencing the location of Plant X near Amherst, Texas. Months of study and exploration were required to pick the site where all these conditions would be met. During the long period of investigation the station was referred to as "Plant X"—implying the many unknowns involved in the final plant design and location. When the "X" marking the "spot" was at last placed on the system map, the name had become so firmly established that it was decided to christen the station Plant X.

THE design of the initial unit, now in operation, incorporated several innovations of interest to plant designers, and the past year of actual service has developed operational data which indicates exceptionally good performance is being obtained.

### Cooling System

The cooling system employed makes use of two mechanical draft towers for each unit, and in order to reduce the extreme distances which must be walked by an operator in normal attendance of

Rear view of Southwestern Public Service Company's Plant X. No. 2 boiler (1,000,000 lb/hr) is under construction.



Please turn this page to see how this stack looked before the installation of an American Blower ST Fly Ash Precipitator.

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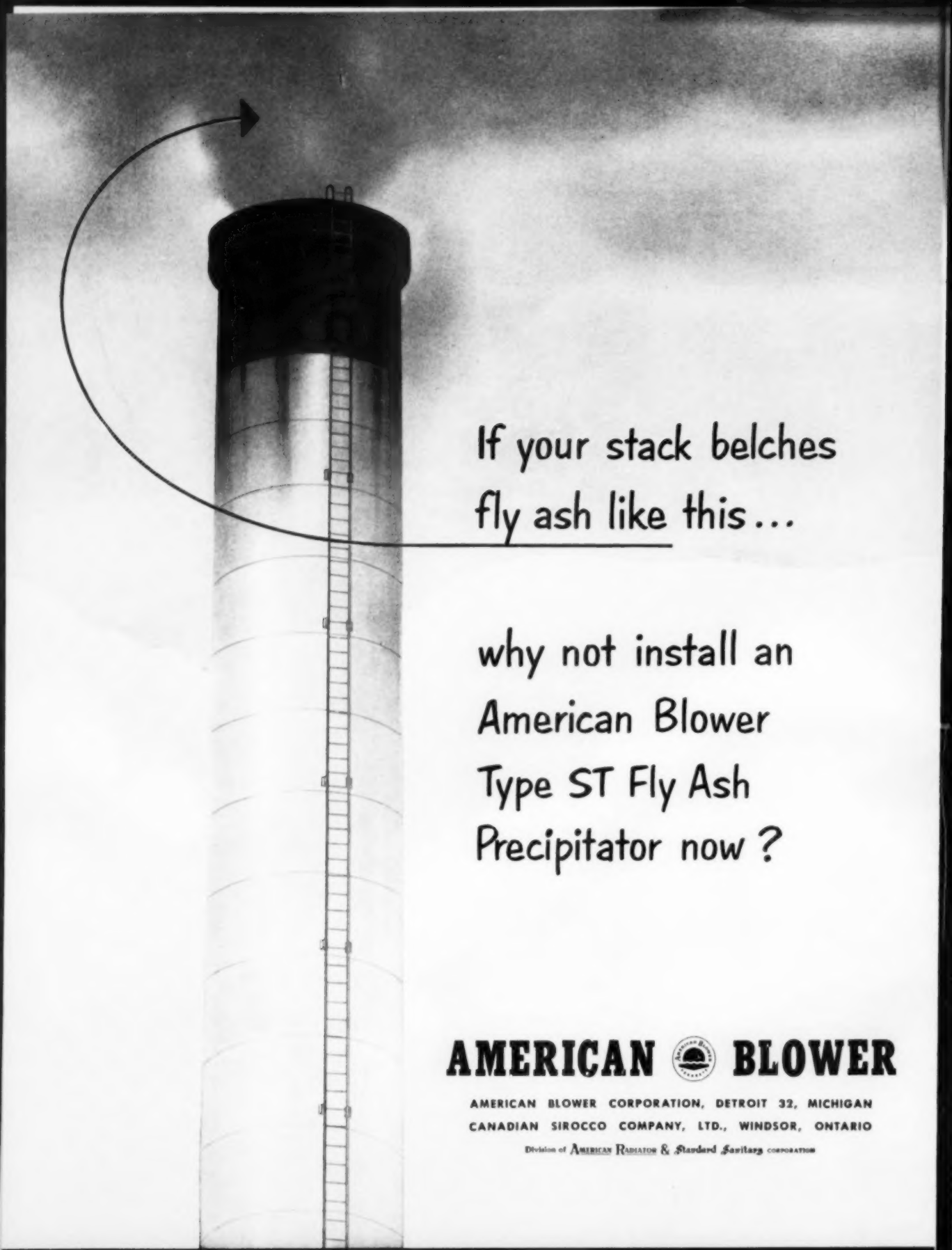

If your stack belches fly ash like this...

why not install an American Blower Type ST Fly Ash Precipitator now?

**AMERICAN BLOWER**

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary corporation

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You turn on the steam.

This little stainless steel valve—the only moving part in the Yarway Impulse Steam Trap installed on the equipment—opens wide and *stays* open as the air and condensate continuously pour through.

*The equipment reaches production temperature in the quickest possible time.*

Production temperature reached, the little valve snaps shut. After that, by a pulsating action, it discharges all condensate as it forms—even a tiny teaspoonful. *There's hot steam in the equipment all the time . . .* steady, maximum temperatures are maintained.

It all adds up—to more production per day.

Other profit-making features of the Yarway Impulse Steam Trap—low initial cost, easy installation, stainless steel construction, low maintenance, good for all pressures, quick delivery from over 200 local industrial distributors.

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For free Yarway Impulse Steam Trap Bulletin T-1740, write . . .

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**Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.**
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* *. . . resulting in fast heat-up of equipment, more production per day.*

**YARWAY** | ***impulse steam trap***

Two 22,500 gpm Fluor Corp. induced draft cooling towers, each equipped with five 50 hp, 2-speed fan drive motors, are used for the first unit. Towers operate in parallel and are placed in wheel-spoke configuration. Advantages include: compact arrangement as an aid to operation, maximum saturable air volume contained within minimum circumference, and first costs minimized since pipe and flume lengths are reduced. Nine cell unit in background is for No. 2 generating unit.

towers, the units are placed in a wheel-spoke arrangement. The concrete intake flume, common to all the towers, is constructed in the form of a hexagon with each of the six sides forming one end of a tower basin. With two sides of the hexagon utilized for each generating unit the cluster of six towers will be complete when the third unit is installed. This arrangement has been found to afford several advantages: (a) compact arrangement facilitates operation, (b) performance remains unchanged regardless of the wind direction, (c) first costs are minimized since pipe and flume lengths are reduced.

Installed within the first two towers erected are banks of coil-shed type heat exchangers which serve as the cooling system for the hydrogen coolers, spare oil coolers hydraulic coupling coolers, and air compressors. Hot water discharging from these auxiliary coolers is pumped to the heat exchanger coils mounted in the cooling towers, where cooled condenser water, falling over the coils, accomplishes the necessary reduction in temperature.

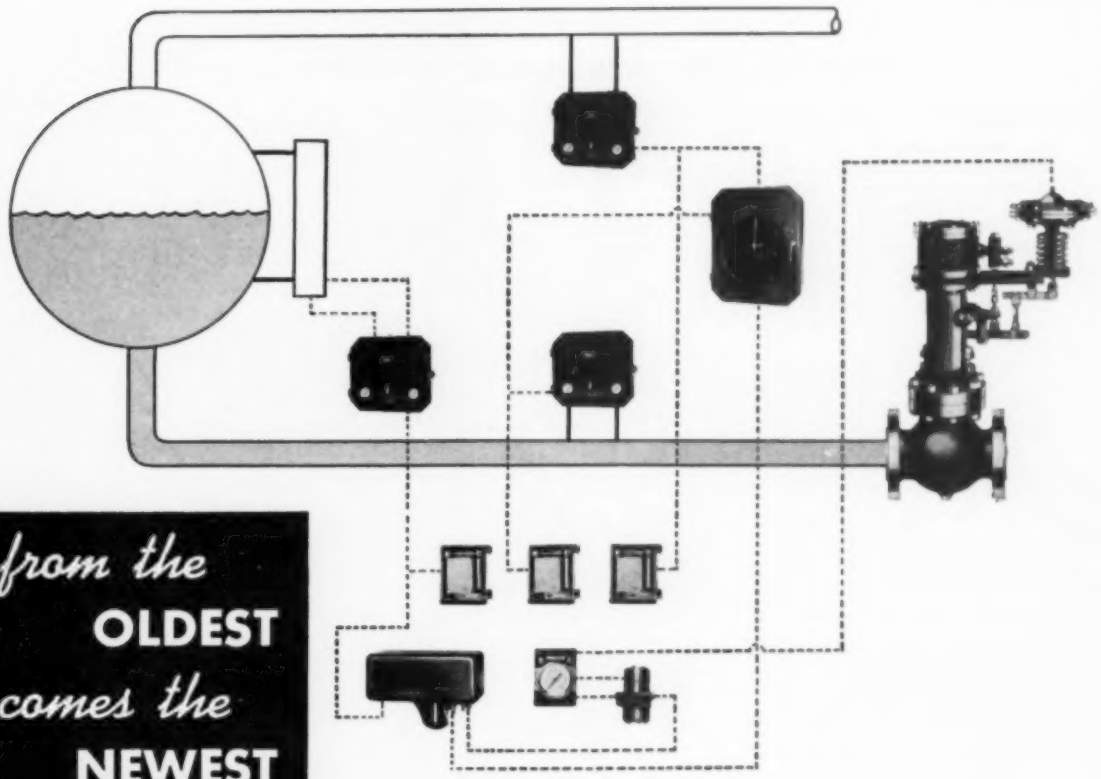
Of interest to the operator is the type of mounting employed for the coil-shed coolers. Since the build up of deposits on the coils cannot be completely eliminated, the coils must be removed periodically for cleaning. Easy removal is made possible by equipping each cooler with flanged wheels which run on angle iron tracks. By removing the

## Unusual design features of Plant X . . .

**Water Treatment**—Automatic control-feeding system for injection of sulfuric acid for scale prevention and chlorine for algae control in condenser water. . . . Since treated makeup water required in system is a function of heat load on condenser plus blow down requirements for concentration control, a meter recording flow of condensate from condenser hot well is used to evaluate heat load on condenser and a flow meter uses this indication to regulate amount of makeup water and acid required. . . . A level recorder, overriding all other controls, prevents water in system from overflowing or dropping too low.

**Cooling Tower Design**—Unusual type of mounting within towers for easy removal of coil-shed coolers . . . to facilitate deposit removal, cooling units equipped with flanged wheels which run on angle iron tracks . . . removal effected by breaking pipe connections and pulling coolers out through special doors in towers.

Two cooling towers per generating unit . . . Towers operate in parallel and are placed in wheel-spoke configuration . . . Advantages include: (a) performance not affected by wind direction, (b) compact arrangement aid to operation, (c) maximum saturable air volume contained within minimum circumference, and (d) first costs minimized since pipe and flume lengths are reduced.



*from the* **OLDEST** *comes the* **NEWEST**

# IN THREE-INFLUENCE BOILER FEED WATER CONTROL

## *Type 3-L with instrumentation by Taylor*

COPES . . . the oldest name in boiler feed water regulation . . . now offers you the newest in three-influence feed water control. Combined in the new COPES Type 3-L are . . .

. . . the scientific balance, characterized ports and rugged dependability of the COPES control valve.

. . . plus the unequalled responsiveness and accuracy of *instrumentation by Taylor.*

And Copes-Vulcan assumes undivided responsibility for service, whenever or wherever needed . . . throughout the life of the installation.

Write for Bulletin 1013. It tells the story of the newest feed water control to come from COPES . . . the oldest name in boiler feed water regulation.

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CONTINENTAL FOUNDRY & MACHINE COMPANY
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COPES VULCAN

**BOILER CONTROL**

***Three-influence mechanically-operated and three-influence electrically-operated regulators are also available.***

WITH INSTRUMENTATION BY *Taylor*

## Production & Operating Data for Month of March, 1953

| Name of Station | Plant X—Unit #1 |
|---|---|
| Kva Rating | 60,000 |
| Kw Rating Nameplate | 40,000 |
| Continuous Rated Capacity Kw | 52,500 |
| Boiler Capacity Thousands Lb/Hr | 500 |
| Hours Plant Operated | 717 |
| Total Generation Thousands Kwh | 26,449.5 |
| Total Output Thousands Kwh | 24,853.5 |
| Station Aux. Power Thousands Kwh | 1,596.0 |
| Station Aux. Power % of Gross | 6.0 |
| Max. Hour Gross Generation Kwh | 54,500 |
| Max. Hour Net Generation Kwh | 51,500 |
| Station Load Factor % | 67.18 |
| Power Factor Thru Max. Hour % | 97 |
| Total Makeup Water-Cooling M Gal. | 24,412 |
| Total Makeup Water-Boilers M Gal. | 480 |
| Total Water Used Gal./Net Kwh | 1.002 |

| Name of Station | Plant X—Unit #1 |
|---|---|
| Total Fuel Gas Used M Cu Ft | 298,569 |
| Heat Value of Gas Btu/Cu Ft | 1,000 |
| Cost of Gas $/Million Btu | .13 |
| Station Heat Rate Btu/Net Kwh | 11,290 |
| Employees—Superv. & Eng. (Number) | 8 |
| Employees—Operation (Number) | 24 |
| Employees—Maintenance (Number) | 5 |
| Full Load Steam Rate Unit #1 Lbs Gr. Kw | 8.89 |
| Efficiency Boiler #1 % | 84.1 |
| Fuel Cost Mills/Net Kwh | 1.56 |
| Water Cost Mills/Net Kwh | 0.03 |
| Operating Labor Mills/Net Kwh | 0.44 |
| Misc. Oper. Expense Mills/Net Kwh | 0.04 |
| Boiler Maintenance Mills/Net Kwh | 0.04 |
| Turbine Maintenance Mills/Net Kwh | 0.04 |
| Other Maintenance Mills/Net Kwh | 0.05 |
| Total—Mills/Net Kwh | 2.20 |

pipe connections the coolers may be withdrawn through doors in the side of the tower.

Makeup water for the cooling towers is obtained from deep wells drilled on one mile spacing over an area of 10,000 acres surrounding the plant. The wells, each having a capacity of 500 gpm, are so connected that three wells "float" on an automatic level control system over a wired circuit, and the remainder are manually operated by short wave radio.

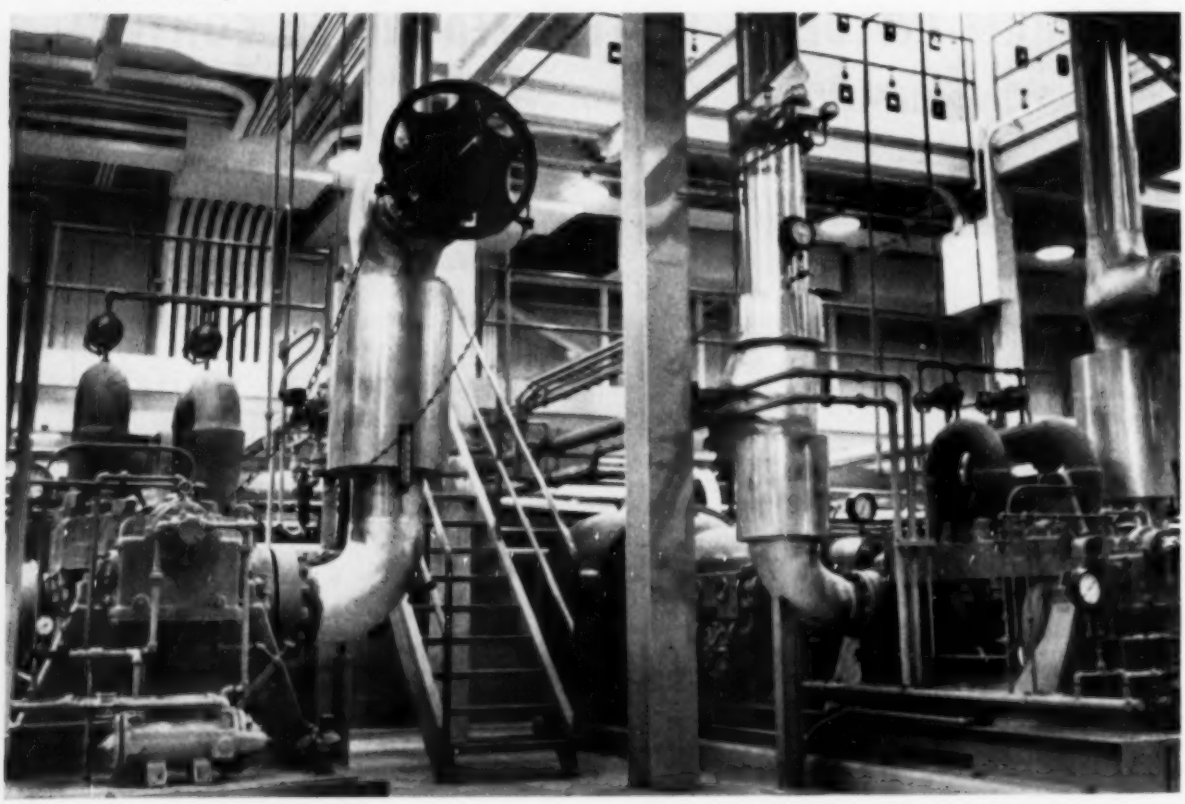
### Water Treating

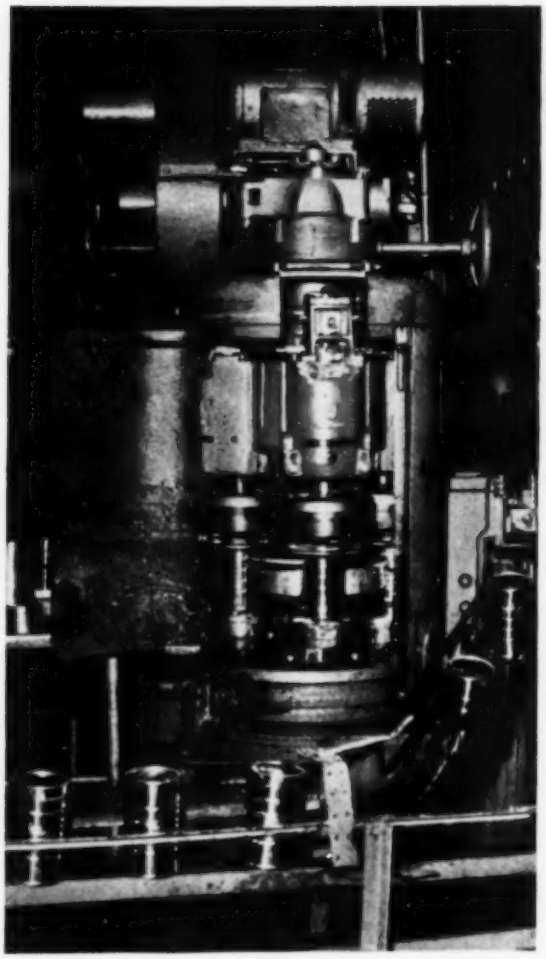
Raw water from the deep wells is collected in a large receiving tank located near the towers at an elevation which permits gravity flow through the makeup flow-control metering and treating system before entering the tower basin.

A new system of automatic control for regulating the makeup flow and water treatment was devised for use at Plant X, which during the past months of operation, has proved so effective that the system will be set up as standard equipment in future Southwestern plants.

This system when combined with automatic well pump control results

Interior view of Plant X shows two Worthington Corporation 1165 gpm, 1125 psi total head, 3600 rpm boiler feed pumps. Each pump is equipped with an American Blower, Gyrol Fluid Drive hydraulic coupling, rated 1100 bhp at 3600 rpm. Pump drives are 1250 hp General Electric motors. Unibestos pipe insulation was used with aluminum jacket covering.





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. . . says W. F. Davis,

Supt. of Maintenance, Bordo Products Co., Winter Haven, Florida

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LITHOLINE could help in your operations, too. Why not call your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

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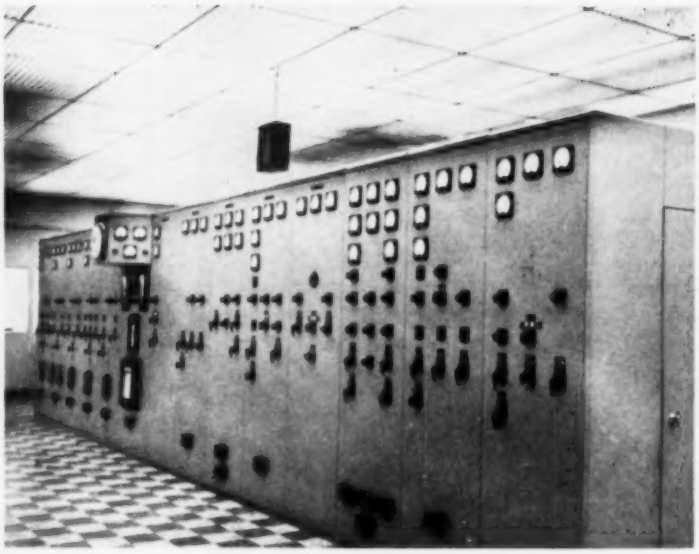
for longer bearing life



Portion of control room showing Westinghouse switchboard. The double faced synchroscope in center of the panel is visible from either end of board. An intercommunication speaker is suspended over the board. Note Benjamin Electric Mfg. Co. luminous ceiling. Hauserman control room partitions were also used.

in (a) constant water level in the basins, (b) stabilized concentration of the dissolved solids in the cooling water, (c) constant pH of the water. These benefits are accomplished with a great reduction in the manhours which are required by the usual methods of handling the cooling water makeup. The close control possible with the new system also effects a considerable saving in water, which is often of great importance to companies operating in areas where water is in short supply.

For the benefit of those interested in this phase of plant design, the water control system "feels" the heat load on the condenser and regulates the tower blowoff flow, tower makeup flow, and the water treatment to correlate closely the makeup requirements with the load on the plant. Further details will be supplied by the author to those interested.

### Boiler & Accessories

Steam is supplied to the first unit of Plant X by a 500,000 lb/hr, three-drum Combustion Engineering boiler designed for 875 lb, 900 F steam conditions. Twelve Forney DY-6 combination gas and oil burners are mounted at the rear of the boiler. As anticipated the rear firing of this type boiler has proved satisfactory. Slight modifications, planned for the next major overhaul period, are expected to improve the range of superheat control which at present is too small to give peak efficiency at light loads. Guaranteed boiler efficiency is 82%, but the unit consistently operates at 84%.

Bailey three-element feedwater control is used to vary the speed of the American Blower Corp. hydraulic couplings in accordance with boiler water level requirements. This system works very satisfactorily without the use of a control valve in the pump discharge, although during the initial start-up operations a misoperation of the boiler disclosed a weakness which has since been rectified.

The difficulty resulted when a workman jarred the boiler panel, causing a misoperation of the mercury switch which energizes the solenoid operated gas valve trip. When the boiler tripped out of service its pressure dropped rapidly to a low of 400 lb and at this pressure the boiler feed pumps continued to supply water to the boiler until the steam drums were full.

Carry-over into the turbine was averted only by quick action of the operators who tripped the turbine throttle valve and the boiler feed pump motors. Investigation disclosed the 3-element control had been set for a narrow range of speed control on the hydraulic couplings, which permitted the pumps to deliver water at the low boiler pressure although the hydraulic couplings had reached the minimum speed possible with the control setting. Subsequent changes were made in the controls which permit the pump speeds to drop to a point too low to deliver water in event the boiler trips out.

### Turbine-Generators

No difficulties have developed in the General Electric tandem compound, double flow, 50,000 kw, 850 lb, 900 F turbine-generator.

The unit, although rated at 50,000 kw maximum capability, has been operated at 54,000 kw over peak hours, and has produced an average plant heat rate of 11,290/net kwh at a station load factor of 67.29. The actual heat rate betters the expected rate by about 400 Btu/nkwh.

### Condensing Equipment

An Allis-Chalmers 42,500 sq ft, horizontal, two pass, divided water box condenser serves the turbine. This unit incorporates the usual Allis-Chalmers design in which cooling water is introduced into the top half and discharges from the bottom pass. Arsenical Admiralty $\frac{7}{8}$ in. od, 18 BWG tubes are used. The use of Arsenical Admiralty metal has proved very satisfactory in preventing dezincification which was prevalent over the system where Muntz, brass, and plain Admiralty metals were used.

Cooling water for the condenser is provided by two horizontal circulating water pumps, each having a capacity of 22,100 gpm at a 75 ft. total head. Due to space limitations, and to effect a substantial saving in equipment costs, the conventional check valves on the pump discharges were omitted.

Replacing the check valves are 36 in. power operated rubber seated butterfly valves, interlocked with the pump motor starters. The

(*Continued on page* 99)

# PETROCHEMICALS BEHAVE

in

# HORTON

Stainless
Steel
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*Horton stainless steel tanks for chemical storage at Celanese Corporation of America's new plant near Pampa, Texas.*

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Detroit 26.....1534 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17.1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3..1646—1700 Walnut St. Bldg.
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***Automatic fuel flow control to T.C.I. open hearths . . .***

# Better Btu Budgeting

**By M. F. HALL**
Instrumentation Engineer
Minneapolis-Honeywell Regulator Company
Industrial Division
Birmingham, Alabama

AN outstanding example of how modern automatic control methods can boost steel processing efficiency is U. S. Steel's Fairfield Steel Works at Birmingham, Alabama. The plant has 12 open hearth furnaces turning out some 5,000 tons of steel every 24 hours.

The Fairfield plant utilizes a multiplicity of industrial instruments to indicate, record, integrate and automatically control the flow of liquid and gaseous fuels to the open hearths. The results — an increase in refractory life and marked savings in fuel consumption.

Since each open hearth has a capacity of around 200 tons per heat, and since each heat is subjected to a high temperature (in the neighborhood of 3000 F) for from 10 to 12 hours, it isn't difficult to appreciate the fact that even a small saving in fuel consumption per furnace per hour can mount into a sizable figure.

Moreover, the refractory roofs of the open hearths would have their lives materially shortened by exposure to excessively high temperatures. Therefore proper regulation of fuel flow, by holding furnace temperatures below the critical level, increases refractory life. The result is a lengthening of the periods between furnace rebuilds which, of course, means more steel produced at a lower operating cost over any given period of time.

### Former Control

Prior to installation of the present automatic control systems, fuel to each open hearth was controlled manually by the helper. Instru-

Open hearth floor of U. S. Steel's Fairfield Works, Birmingham, Alabama.

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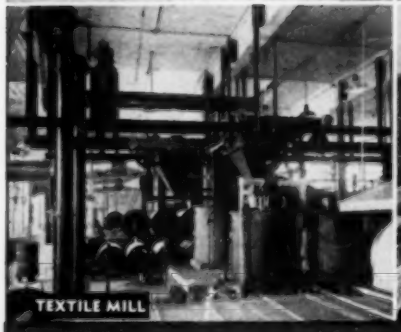
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ments on the control panelboard indicated and recorded fuel flow. However, when the progress of the heat called for a change in Btu input (as indicated by a temperature recording instrument), it was necessary, when operating with coke oven gas, for the helper to leave the panelboard and manually readjust gas valves located at both ends of the furnace. After making the adjustment, he had to return to the panelboard to observe the resulting change in fuel flow.

### Automatic System

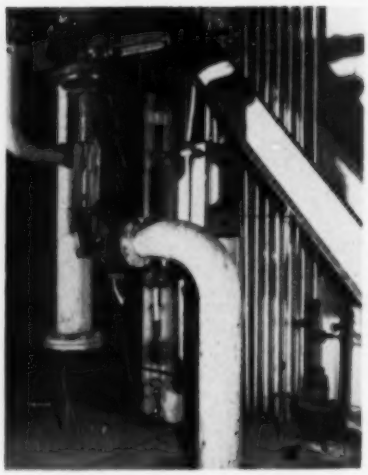
With the automatic control system now in use, the helper changes the Btu input when necessary without leaving the panelboard. The two panel-mounted electronic inductance bridge receivers, developed by Minneapolis-Honeywell's Industrial Division, not only indicate and record flows of liquid and gaseous fuels to the burners, but also integrate and automatically control these flows.

Since the operator is basically interested in Btu input to the furnace, the gas flow controller is equipped with a double scale graduated 0-85 and 0-120 million Btu's per hour. One scale is for natural gas, the other for coke oven gas. The liquid flow controller, which handles either tar or fuel oil, is at present calibrated 0-800 gph, but will be converted to read Btu's per hour.

Each instrument incorporates a pneumatic control unit plus an electronic integrator. This totalizes the flow of the measured fluid. The control unit in the gas flow controller operates a Honeywell diaphragm operator which positions a 6 in. butterfly valve in the gas line. A similar control unit in the second instrument operates a ¾ in. valve in the liquid fuel line.

### Two Meter Bodies Measure Four Fluids

Although a total of four fluids (natural or coke oven gas, tar or fuel oil) are used at various times to fire the open hearths, only two meter bodies are required. Both use electric transmission. A low differential type flow transmitter meters the flow of either gas. Any error in measurement introduced by differences in the specific gravities of the two gases is of too little significance to affect the satisfactory operation of the control system.



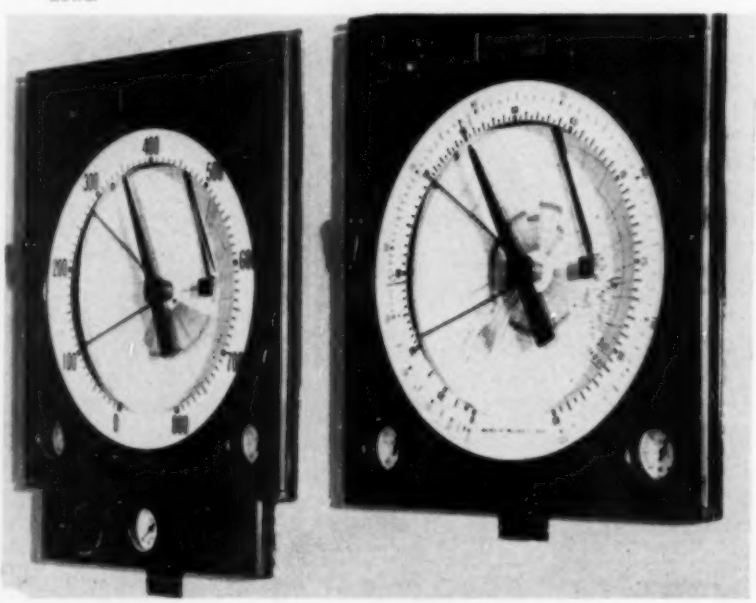
Flow meter (arrow) measures and Honeywell diaphragm operator on butterfly valve controls flow of gas to burners.

The flow of liquid fuels is measured by an area meter which is piped so that it can handle either tar or fuel oil. When tar is being fired to the open hearths, it passes through a heat exchanger before entering the meter body. A measuring error of about 10% is caused by the differences in the specific gravities of tar and fuel oil. However, this error is compensated for by a difference of about 10% in the Btu contents of the two fuels. After the meter body has been measuring tar flow, it is flushed out before being used to meter fuel oil. When a change from fuel oil to tar is made, no preliminary flushing is required.

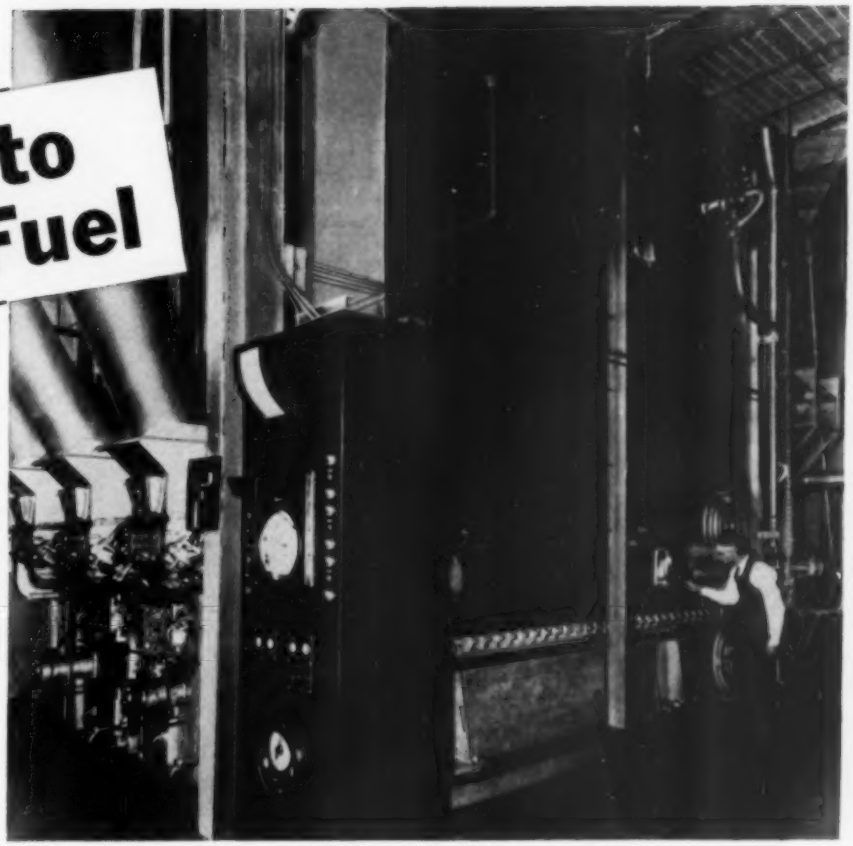
Although the normal liquid fuel flow to the open hearths is around 200 gph, the liquid fuel flow controller has a range of 0-800 gph. This high range was purposely selected in order to be able to handle those winter periods when the supply of natural gas is restricted and the liquid fuel input must be stepped up in order to supply the required Btu's to the furnace. It was found that control is equally accurate at both the high and low flow rates.

Savings in fuel and refractories resulting from automatic fuel flow control are largely attributable to two factors. First, a helper can quickly tell exactly how much fuel is flowing to the furnace and has the assurance that the indicated rate will automatically be maintained. Secondly when a change in fuel rate is called for, this helper only has to reset the control indices of two instruments—itself a quick, easily-performed operation that does not take him away from the panelboard.

These two panel-mounted electronic inductance bridge receivers (Minneapolis-Honeywell) not only indicate and record flows of liquid and gaseous fuels to the burners, but also integrate and automatically control these flows.



# How to Save Fuel



Fuel savings of 15% have resulted from steam plant modernization at General Mills, Inc., Buffalo, N. Y. The program included this installation of Bailey Meter Control on a 45,000 lb per hr, 170 psi spreader stoker-fired boiler.

● The heat energy you get from a unit of fuel depends on the performance of your steam plant equipment. And that's where Bailey controls can help. With a Bailey-engineered control system you can count on a higher output of available energy per unit of fuel. Here's why:

### 1. Suitable Equipment

When you receive equipment recommendations from a Bailey Engineer his selections come from a complete line of well-engineered and carefully tested products.

### 2. Seasoned Engineering Experience

Your local Bailey Engineer brings you seasoned engineering experience based on thousands of successful installations involving problems in measurement, combustion, and automatic control.

### 3. Direct Sales-Service—close to you

For your convenience and to save time and travel expense there's a Bailey District Office or Resident Engineer in or close to your industrial community.

For greater fuel savings, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're glad to stand on our record.

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+ Bailey Design
+ Bailey Engineering
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= Greater Savings
per Fuel Dollar

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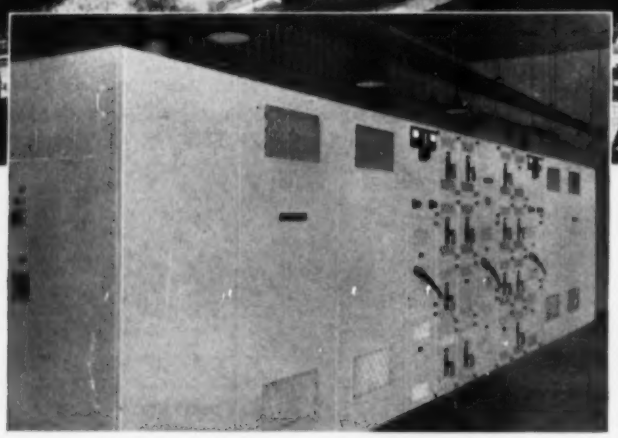
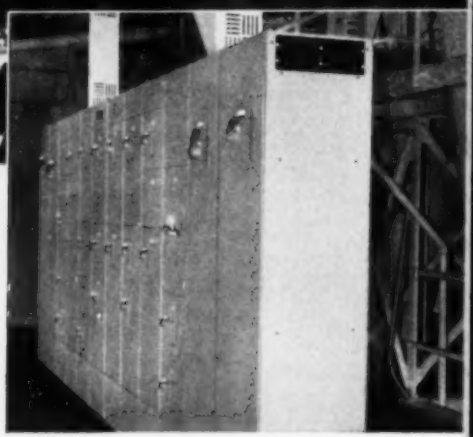
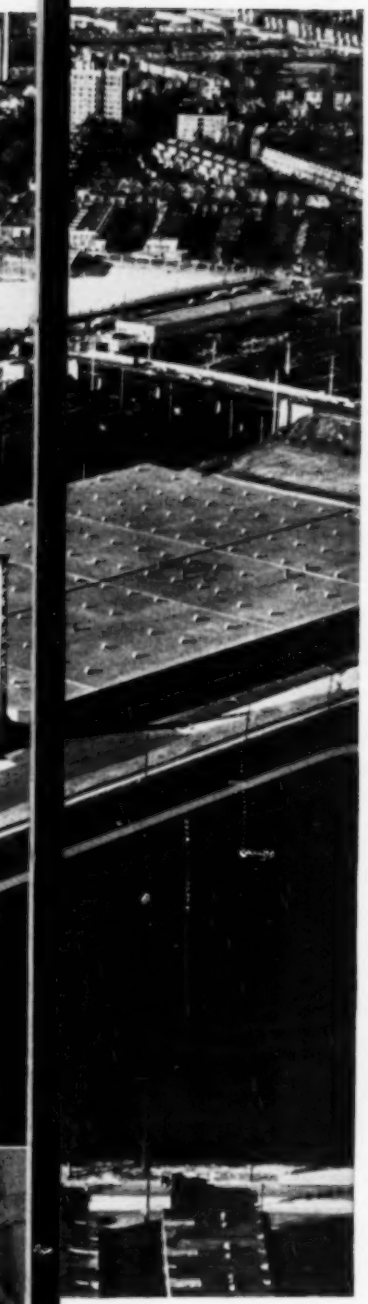
American Stores Co. new plant has world's largest grocery warehouse and nation's most modern bakery—17 acres, or four city blocks, under one roof! All electrical construction by Harry F. Ortlip, Philadelphia, Pa.



Westinghouse 2000 kva Double-Ended Indoor Power Center is one of three located in the bakery where loads are particularly heavy and concentrated.



Westinghouse Type Control Center is compact . . . centralizes control. Starters are mounted back-to-back to save space in the bakery control room.



# Excellent service continuity assured by dual, low-cost power system

An interesting power distribution problem resulted when American Stores Company planned its huge grocery warehouse and automatic bakery at Philadelphia, Pa. There, as a supply center for several hundred retail outlets, vast materials handling and food processing activities would be required. Both demanded highly reliable electrical service, at minimum cost.

Working closely with Ganteaume & McMullen, Engineers-Architects, of Boston, Mass., Westinghouse engineers helped adapt a secondary selective radial distribution system.

In the bakery, where continuous operation is exceedingly vital, the system supplies each load center over two primary feeders and through duplicate transformers. Thus, failure of one feeder cable or transformer permits immediate transfer of load to another feeder and transformer. Excellent service continuity is assured.

A lesser degree of continuity is required in the warehouse. Here, a bus tie feeder is located between two substations. It permits a limited amount of power to be made available to the other switchgear should one substation fail.

Westinghouse unitized equipment helped reduce power distribution costs. Use of five Westinghouse Power Centers enabled American Stores to bring high voltage close to the loads. Lower copper losses and minimum voltage drop resulted. Too, short secondary runs saved a considerable amount of copper. Improved voltage at the load was assured; losses were minimized.

Whether you are involved in a new construction project or plant modernization program, Westinghouse offers you the same assistance. Our engineers are ready to help you and your engineers plan a modern distribution system . . . and match it with a complete line of well engineered equipment.

For full details, call your nearest Westinghouse Office. Or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-94007

YOU CAN BE SURE... IF IT'S Westinghouse

*Drilling metal without touching it . . .*

# ELECTRON DRILLING

## Georgia—Lockheed reports on broken tap, drill and stud removal . . .

ALTHOUGH the principle of precision electron drilling was developed some 10 years ago, recent refinements (including automatic feed) have greatly increased its usefulness and efficiency. One of the recently designed Elox Dual-Purpose units is employed for both production and maintenance purposes at Lockheed Aircraft Corporation in Marietta, Georgia. Lockheed's Georgia Division produces the Air Force's B-47 Stratojet and C-130A turbo-prop transport.

### Drilling Principle

The machine drills by creating a series of intermittent electric arcs which disintegrate the hardest metal. The cutting tool is a hollow copper alloy electrode which is checked in a vibrating head. As this electrode vibrates in an up-and-down direction, it comes within .022 inch of the work piece and creates an arc between the two, thus disintegrating or breaking off small particles of the work piece.

The coolant (water mixed with a primer) flowing through the center of the (hollow) electrode under pressure immediately washes the metal particles. An automatic device enables the drill to feed itself at the correct rate of speed for the metal it is working on.

### Applications

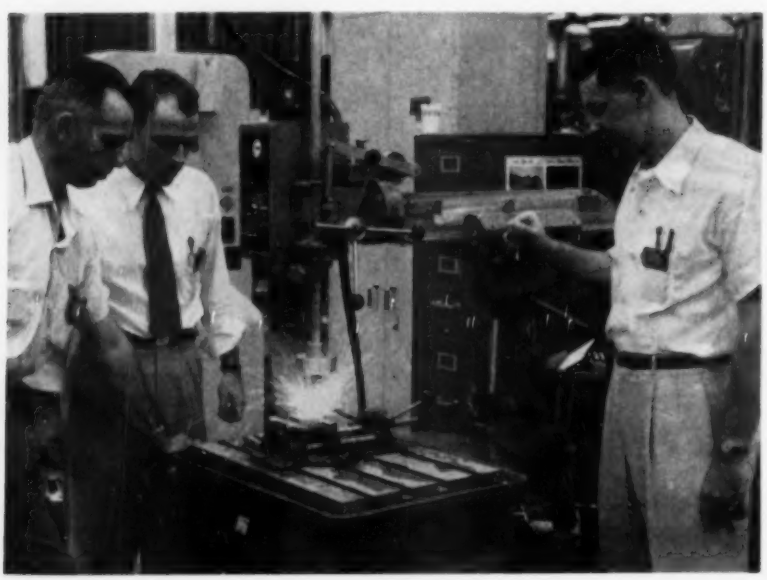
A big money-saving feature of the electronic drill is that Marietta plane builders utilize it to extract broken drills, taps and boring tools from airplane parts and tools which previously had to be scrapped. Salvage of just one large, hard-to-make B-47 piece damaged in the manufacturing process can save the entire cost of the equipment.

Lockheed engineers report that the unit automatically stops and backs itself out of the work piece when it breaks through the underside, or reaches the end of a broken drill or tap. In removing a broken tool, if the electrode touches the side of the parent part, it will stop and back out.

The disintegrator is also used successfully for drilling high heat-treated steel which is too hard for conventional type drilling. The Air Force C-130A has a number of hard steel parts that must be drilled after they are heat treated. Prior to arrival of the new-type drill, these parts presented a problem.

### Automatic Power Feed

The equipment manufacturer emphasizes that it is practically impossible to drill a .020" hole by hand, but relatively simple with the automatic power feed. The latter shouldn't be confused with a gravity feed mechanism. With gravity feed, a tiny particle of metal can create a short and weld the electrode to the work. With the automatic power feed mentioned this can't happen, as the power feed will automatically back out.



Equipment utilized at the Lockheed Aircraft Corporation, Georgia Division, Marietta, Georgia, is an Elox Dual-Purpose M-300 Electron Drill, manufactured by The Elox Corporation of Michigan, Clawson, Michigan. L. W. Abernathy of Lockheed's production machine shops, Jim T. French, manufacturing engineer, and J. E. Lockman, manufacturing research technician are shown with the unit.

Superfine finish and accuracy can be obtained in drilling. Holes can be cut from .030 to two inches in diameter. Odd or irregular-shaped holes within this size range can be drilled by making a copper electrode of the desired shape.

**IDENTIFICATION DISC:** An aluminum marking plate on all Walworth No. 225P's facilitates inventory control and makes reordering quick and positive.

# take a good look at the Walworth "500 Brinell" no. 225P Globe

**NEWLY DESIGNED HANDWHEEL:** Patented air-cooled, finger-fit handwheel affords sure grip even with greasy gloves.

## – the Toughest Bronze Valve Your Money Can Buy

The stainless steel, corrosion resistant seats and discs are heat treated to a hardness of 500 Brinell – hard enough to scratch glass and crush nails! The valve can be closed on sand, slag, and pipe scale without injury to the seating surfaces. "Wire drawing" is practically eliminated. All parts are accurately machined and gaged. Years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas, or air.

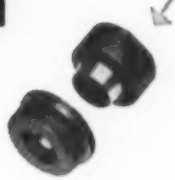
For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular.

**IMPROVED PACKING:** Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure when fully opened.

## *note these 7 Great Features*

**HEXAGONAL UNION BONNET CONNECTION, DEEP STUFFING BOX AND RUGGED STUFFING NUT:** Union bonnet connection eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and reassembled.

**OVERSIZE STEM:** The high-tensile strength silicon-bronze stem assures long life and protection against wear.



**SEATS AND DISCS:** Plug type seats and discs of stainless steel, heat-treated to 500 Brinell hardness and machined simultaneously to a mirror-like finish, with accurate tapers assures tight positive shut-off with minimum handwheel effort.

**EXTRA STRONG BODY:** Made of Composition M (ASTM B61) bronze. Thick walls and rugged hexes provide a high safety factor. Valves undergo hydrostatic shell test of 1,000 psi.

# WALWORTH

## valves and fittings

**60 EAST 42nd STREET, NEW YORK 17, N. Y.**

**DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD**

*Plant engineer often low man . . .*

# Centrifugal Pump "Totem Pole"

### Seven Ways to Keep Out of Trouble

WHEN discussing preventive maintenance, the emphasis is usually on the plant engineer, his system of records, inspections and the work schedules of his "Fix-it" crew. However, if we subject preventive maintenance to an engineering analysis, we find the project is made up of seven major factors.

### First Three Factors

The first three are the design, the materials and the workmanship entering into the construction of the pump. They are of major importance because they determine the structural strength and use life of each part.

Correct design form and proportions are necessary for smooth flow of liquid without excessive velocity and without turbulence.

Workmanship must be accurate because the centrifugal pump today is a precision built machine. A half thousandth of an inch can be the difference between a free running clearance or a destructive rubbing contact. A difference of less than a half thousandth of an inch can be the margin between a tight joint or something that begins as a pin point leak and ends as a destructive jet from a high to a low pressure area.

Dynamic balance should be included in workmanship. Because the destructive effects of unbalanced rotating parts increase in the ratio of the speed squared, dynamic balance is a must.

### Fourth and Fifth Factors

The size and type of pump is selected after a careful analysis and evaluation of the offerings of the various manufacturers. Materials of construction are generally specified by the purchaser on the basis of his experience.

The location of the pump and the design of the piping, is the responsibility of the plant design engineer. He must know the quantity (gpm) of liquid to be pumped, its viscosity and vapor pressure at its pumping temperature, together with the required NPSH of the pump. These data control the design details of the piping between the pump and its source of supply as well as the location of the pump relative to that source.

The most effective contribution to preventive maintenance will be made when a pump is properly selected, located and piped. This will insure the pump being filled with solid liquid under all operating conditions, and the elimination of destructive cavitation resulting from either a starved suction or the excessive release of vapor in the suction. The next best condition will exist if a poorly selected pump is properly located and piped. This pump will, in some degree, respond to preventive maintenance. The impossible condition will exist when a pump, regardless of how selected and piped, is improperly located in relation to its source of supply. No amount of maintenance, preventive or otherwise, will make this a successful installation.

### The Sixth Factor

The installation engineer contributes immeasurably. If the pump and driver are properly aligned, and the necessary precautions taken to insure its cleanliness during installation, his contribution will be on the trouble free, low cost side.

The necessity for accurate alignment of pump and driver is understood by everyone. The necessity for cleanliness is too often overlooked. Because the centrifugal pump is precision built, pipe scale, welding shot or dirt of any description will cause serious damage in a very short time. Foreign materials may accelerate wear even in pumps specially designed for pumping liquid with abrasive material in suspension.

Make cleanliness during installation a must. Do not remove protectors from pipe openings in the pump until the pipes are to be attached. Keep bearings and packing boxes clean; dirt will not prolong the use life of bearings or packing and it is fatal to mechanical shaft seals. Either swab and flush the suction line before connecting it to the pump or install a temporary suction strainer at the pump.

### The Seventh Factor

The seventh factor, the plant engineer, is the "low man on the totem pole." Because of his position, he is not only the recipient of the mistakes of all others on the "totem pole," but he must when possible correct them and save dollars while doing it.

It is difficult to develop a program for prevention without including a cure; consequently, that which starts as a series of preventive measures, may finish as a complete maintenance program. It is not practical to develop a program that would be applicable to all plants. Differences in operating conditions create different problems, not only in different

(*Continued on page* 98)

Adapted from comments by F. B. Applegate, Engineer, Pacific Pumps, Inc., before the Midland, Texas, regional meeting of the Natural Gasoline Association of America.

LADISH *Controlled Quality* ASSURES METALLURGICAL SOUNDNESS

**TENSILE TEST**

One of many comprehensive Ladish laboratory test procedures for assuring reliable performance.

Photographed in Ladish Metallurgical and Research Laboratories

TO MARK PROGRESS

## *Testing the breaking point of metal*... proves Ladish fittings have ample strength to meet the test of maximum service

Optimum strength — proved by scientific test — typifies the outstanding values in Ladish fittings that result from special emphasis on sound metallurgy and advanced facilities. Shown here is modern Universal tensile testing equipment on which ultimate strength, yield strength, reduction of area and elastic properties are carefully measured to assure users of Ladish Controlled Quality fittings the metal quality essential for reliable performance.

THE COMPLETE *Controlled Quality* FITTINGS LINE
PRODUCED UNDER ONE ROOF... ONE RESPONSIBILITY

**LADISH CO.**

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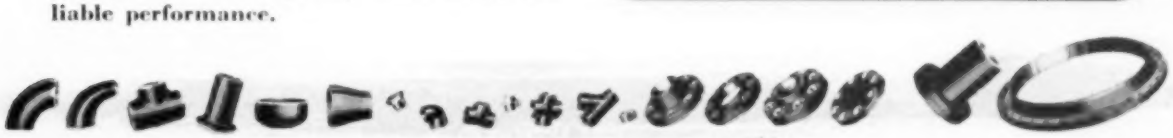
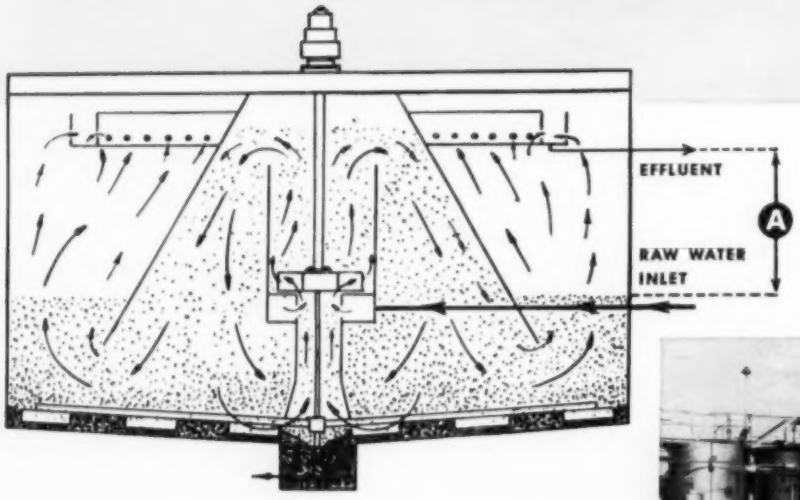
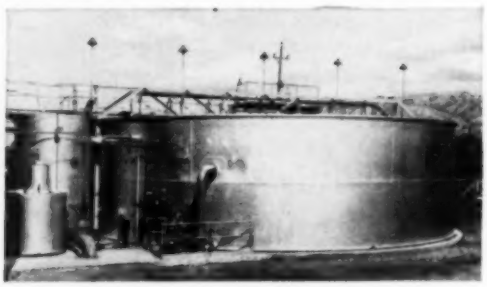
District Offices: New York • Buffalo • Pittsburgh • Philadelphia • Cleveland • Chicago • St. Paul
St. Louis • Atlanta • Houston • Tulsa • Los Angeles • San Francisco • Havana • Mexico City • Brantford, Ont.



WHY ***THIS*** WATER CLARIFIER GIVES YOU

# *Constant Clarity at Variable Loads*



One proof of sound design is the ability to take in stride wide fluctuations in load and still produce uniformly low turbidity water. The Graver Reactivator, which has this built-in feature, was designed with this requirement in mind.

Note the diagram above and see the height "A" provided between the sludge bed level and the effluent collector at the top of the tank. This depth of clarified water is your assurance of protection against carryover during sudden load increases —constant effluent clarity—a dependable water supply.

Recently, Graver test engineers subjected a large Reactivator at an eastern paper plant to a 70% load increase within a 2-minute period. Result—the effluent turbidity remained unchanged at 5 ppm—well below the customary guarantee when operating at normal load fluctuation.

## *Other Exclusive Graver Reactivator Features*

1. Full bottom area for solids concentration and collection.
2. Separately driven sludge scraper and blades.
3. Positive and intimate contact of incoming water with sludge by gentle recirculation with a variable speed impeller.

For best results in solving your water treatment problems, get the benefit of Graver's 40 years of specialized experience, proven designs and unequalled facilities.

GRAVER **Reactivators**

EQUIPMENT FOR ALL WATER AND WASTE TREATMENT PROCESSES

**GRAVER WATER CONDITIONING CO.**

*Division of Graver Tank & Mfg. Co., Inc.*

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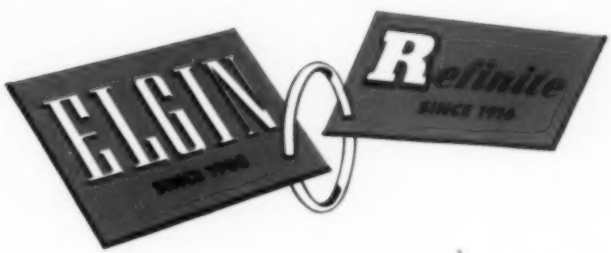
GW478

*Announcing:*

# WATER CONDITIONING'S GREATEST STRIDE AHEAD!




## *Two leaders join forces to give you A New and Broader Water Conditioning Service*

Yes, two of the great names in water conditioning are united: Refinite Sales Co. has joined Elgin Softener Corporation. Now it is "Elgin-Refinite, Inc." . . . and this linking of products, experience, men and methods truly marks the beginning of a new era for those who seek the answer to a water conditioning problem.

You know these firms. Both have played major roles in water conditioning for a long time: Elgin since 1908; Refinite, since 1916. But now — through the pooling of the best of all they have learned — each has made its greatest gain.

The Elgin-Refinite man has something *new* for you —something he did not have as an Elgin man or as a Refinite man. He has something new in products and viewpoint that enable him to give you the most direct, effective, economical solution to *ANY* water conditioning problem. The coupon provides a convenient way to ask for the Elgin-Refinite solution to your problems.

**ELGIN-REFINITE, INC.**

***A DIVISION OF ELGIN SOFTENER CORPORATION, ELGIN, ILL.***

***REPRESENTATIVES IN PRINCIPAL CITIES***

**The Most Comprehensive and Authoritative Line**

Typical of the broad scope of Elgin-Refinite products are: chemical feed systems, zeolite softeners, ion-exchange systems including deionization, lime-soda softening, deaerating heaters, filtration equipment of all types including diatomite filters, and swimming pool equipment. Chances are that one of these systems will fit your water conditioning needs. But whatever your need, we can "tailor" any type of system to produce water of the exact characteristics you require.

***IN CANADA: G. F. STERNE AND SONS, BRANTFORD***

**SEND FACTS ABOUT:** ☐ Water Softeners; ☐ Clarifiers; ☐ Filters; ☐ Deionizers; ☐ Deaerating Heaters; ☐ Chemical Treatment. ☐ Swimming Pool Equipment.

Water Conditioning for: ☐ Boilers; ☐ Processing; ☐ Waterworks;

(If you have other needs attach note)

☐ Hurry ☐ Take Your Time ☐ Send Representative

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Mail to Elgin-Refinite, Inc., 132 North Grove Ave., Elgin, Ill.

# TRAINING FOREMEN

## Comments on the FOUR STEP METHOD

**By R. L. NICHOLS,** Division Foreman, Magnolia Petroleum Company, Beaumont, Texas

*Don't convert a good mechanic into a poor foreman. Give him proper counseling. Use this four step method in teaching the many additional requirements of the new job.*

THE Four Step Method of Instruction has been applied to the manual arts and skills for quite some time, and is widely accepted as the one best method. Until recent years, however, many responsible people have felt that the method was not applicable to the training of supervisors, particularly first line supervisors, or foremen.

Potential supervisors have normally been chosen because of their aggressiveness and job knowledge, and set up as supervisors with little or no instruction or counseling. They have been expected to learn the many additional requirements of their new jobs, particularly the handling of men, by instinct and experience.

This has led to poor cooperation, costly delays, and union squabbles. All too frequently the end result has been the conversion of a good mechanic into a poor foreman.

It is the purpose of this discussion to show that the Four Step Method is applicable to the training of Foremen, and to offer a few suggestions for using it.

The Four Steps concerned are these:

Step 1—Prepare the Learner
Step 2—Demonstrate the Operation
Step 3—Application or Try Out
Step 4—Follow-up (Supervise)

### Prepare the Learner

STEP ONE can, and should be, where possible, a group proposition. At Magnolia this step has been handled by the Conference Method.

Small groups of supervisors and/or people who are in line to become supervisors, are brought together with a trained conference leader, who should preferably be a company employee, not too high up in management. The job of the conference leader is to *lead* discussions—never to *direct* or give answers. The object of the first conference is to persuade the participants to outline the qualifications and skills required of a good supervisor, and thus convince themselves.

Magnolia has used for this purpose the Topic Heading—DEVELOPING UNDERSTUDIES.

The leading questions presented to the groups are discussed below.

To the question *"What is an understudy?"* various groups have given thirteen different answers, which all boiled down to one—"An understudy is any individual who is being trained for a higher job."

"Who should have understudies?" brought only one answer—"*All* individuals holding key jobs."

Forty-two items were listed as *"Qualifications desired in an understudy."* It was interesting to note that "Job Knowledge" was suggested, but was rejected by the group on the grounds that if the person concerned did not know the job he should not have been selected for further training.

The forty-two answers offered and accepted could well be summarized as follows:

1. Loyalty: a—to Company
   b—to Employees
2. Ability to get along with people.
3. Ability to plan and co-ordinate work.
4. Initiative—defined as the ability to develop new jobs and methods.

Thirty-seven suggestions were offered on *"How should we train understudies?"* They all add up to this—steps 2, 3 and 4 cannot be successfully handled by group instruction. Individual training by the immediate or near—immediate supervisor is a must from this point on.

Various other subjects designed for orientation and to condition the minds of the people concerned for further training were discussed and answers listed. These subjects were:

a. Indications that understudies are not being trained in the plant.

b. How can we improve our methods of training understudies?

c. What are the advantages of having an understudy?

1. To the leader

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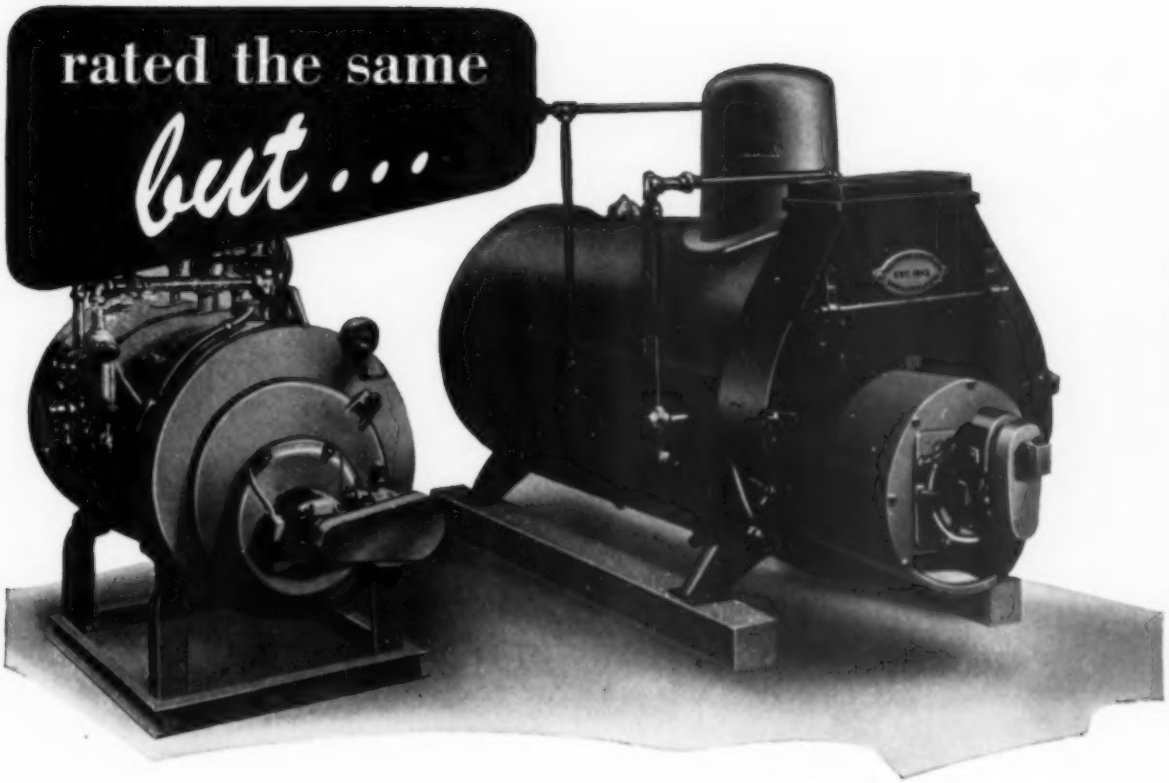


## only the bigger, stronger LEFFEL can deliver when you need extra steam

### Look at these figures

| | LEFFEL BOILER | A "PACKAGE-TYPE" BOILER |
|---|---|---|
| Rating | 20 HP | 20 HP |
| Length | 9' | 6' ± |
| Height | 6'8" | 4'6" ± |
| Heating Surface | 181 sq. ft. | 54 sq. ft. ± |
| Shipping Weight | 6500 lbs. | 2500 lbs. ± |
| *ACTUAL MAXIMUM CAPACITY* | 40 HP 1380# per hr. | 20 HP 690# per hr. ± |

***It will pay you — in the long run — to compare carefully and buy wisely.***

The Leffel boiler is rated at 20 H.P.; so is the little "package-type" steam boiler. All similarity ends with that claimed rating.

The package boiler may deliver 20 H.P. — but no more. The Leffel boiler can be operated day after day at *50 percent above its rating;* in an emergency it can deliver up to 40 H.P. with safety.

Claims can't help you get steam from a boiler which is prone to break down under the strain of continuous operation — which just can't deliver beyond its rating.

There's no corner-cutting in the construction of a Leffel boiler. It's built to take it. Performance proves that Leffel's extra-rugged construction means greater dependability and longer life, plus the ability to carry a 100% overload in an emergency.

One look should tell you that the bigger, obviously stronger Leffel boiler will be a more reliable source for the steam you need. And you will find that despite their greater strength and greater capacity, Leffel boilers are competitively priced.

If you're looking for a completely dependable source for low-cost steam, trouble-free service and simple operation, you'll want to know more about Leffel boilers. They are built in a complete range of sizes from the smallest to the largest Scotch types, for oil, gas or coal firing. Bulletin 236 has all the details; send for your copy today.

FOUNDED IN 1862

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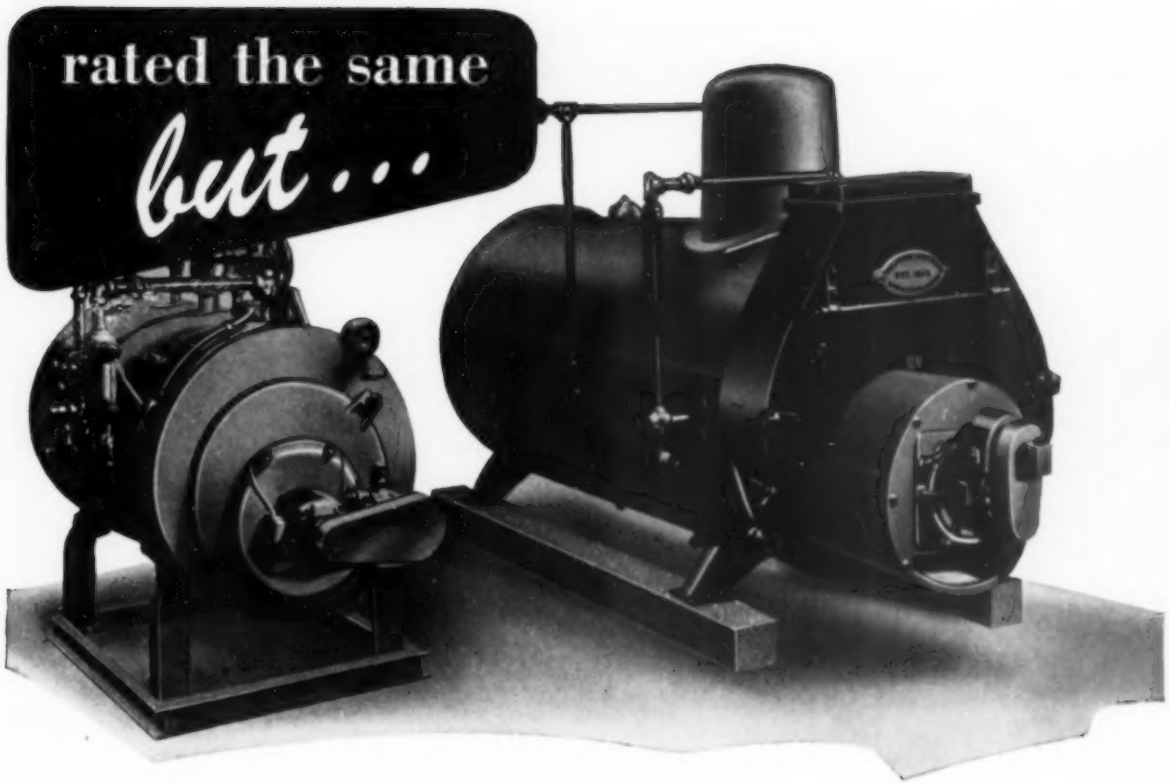


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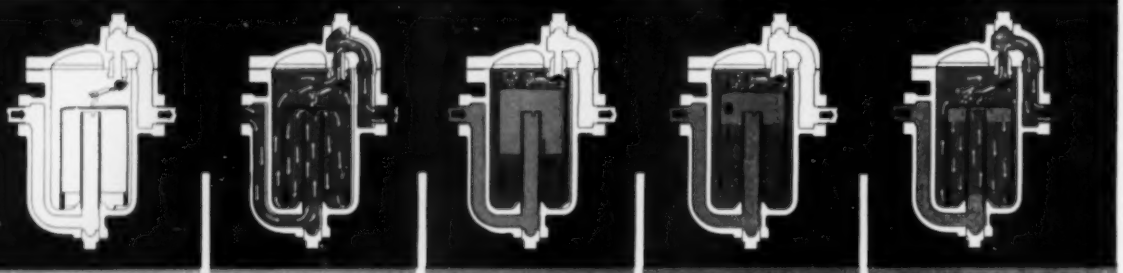
MORE EFFICIENT STEAM GENERATION FOR 91 YEARS

# ARMSTRONG TRAPS are Designed to give Outstanding Performance



**1.** When trap is installed, inverted bucket is down and valve is wide open.

**2.** When steam is turned on, condensate (solid color) flows into trap and out orifice, until . . .

SELF-SCRUBBING ACTION (See Fig. 2 above). Note that condensate first flows down between bottom of bucket and trap body, then up and out through orifice. The high velocity flow under bottom of bucket keeps dirt in suspension, washes it out when trap opens. No dirt problems with Armstrong design.

**3.** . . . steam (light color) reaching the trap floats the inverted bucket and closes the valve.

BUCKET FLOATS WHEN LESS THAN ½ FULL OF STEAM (See Fig. 3 above). The generous margin of safety (dimension A in Fig. 3 above) insures that the bucket will float with trap body partly full of water. A heavier bucket would give more power but it might float and close the valve.

**4.** When more condensate enters, bucket loses buoyancy and pulls on valve lever.

NO AIR BINDING (See Fig. 4 above). Air mixed with steam passes through the bucket vent, collects at top of trap and is discharged ahead of condensate. The large air-handling capacity of Armstrong traps insures top equipment temperatures and faster heat-up.

**5.** When weight of bucket times leverage overcomes pressure on valve, trap opens.

EXCESS POWER FOR OPENING (See Fig. 5 above). Armstrong design provides a generous safety margin. Reducing dimension B in Fig. 4 would increase power of bucket but margin between test opening pressure and operating pressure would be too low to allow for normal wear and pressure fluctuations.

THE highly efficient design of modern Armstrong traps reflects over 40 years' experience in inverted bucket trap manufacture and application.

ARMSTRONG design offers:

- A "frictionless" leverage system which combines high leverage with wide opening of a large orifice.
- A minimum of parts.
- Strong, corrosion-resistant and wear-resistant materials.
- Generous margins of safety.

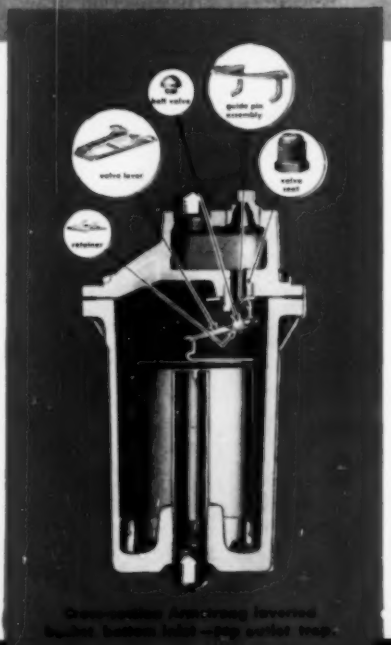
FOR TRAP USERS this means:

- Large capacity.
- Dependable service under adverse operating conditions.
- Low maintenance.
- Continuous operation of heating and process equipment.

The soundness of Armstrong design has been proved in thousands of plants all over the world. To insure dependable condensate drainage simply specify: "Traps shall be Armstrong." For additional information, call your local Armstrong Representative or write:

**ARMSTRONG MACHINE WORKS**
806 Maple Street, Three Rivers, Michigan

● *SEND FOR* NEW 44-PAGE STEAM TRAP BOOK. Complete data on Armstrong trap design and operation; physical data and list prices; capacities; selection, installation and maintenance recommendations free on request.




Cross-section Armstrong Inverted Bucket Bottom Inlet—Top outlet trap.

# ARMSTRONG STEAM TRAPS

One Moving Part Easily Accessible from the Front. Easy removal of Thermostatic Motor and Valve Assembly with only a screwdriver makes it possible to inspect, clean or flush out mixer if necessary.

"HEARD THE GOOD NEWS, FELLAS? THEY'RE GOING TO PUT POWERS MIXERS IN THE SHOWER ROOM.... NO MORE BOOBY TRAP SHOWERS!"

Simple

Durable

Construction

Insures Long Life and Minimum of Maintenance

## Banish "Booby Trap Showers"

Give shower users real safety and comfort

Install POWERS Thermostatic Water Mixers

"POWERS REGULATED SHOWERS ARE TOPS NO 'HALF-SAFE' SHOWERS FOR US!"

See our catalog in Sweets or Write for POWERS Bulletin 365

Just ONE Shower ACCIDENT may cost many times more than POWERS mixers.

• This mixer complies fully with Federal Specifications WW-P-541c.

# *Refreshing · Relaxing Safe Showers*

**—are always enjoyed by bathers in Powers Thermostatically Controlled showers. Water temperature stays where the user wants it. There's no danger of slipping and falling while trying to dodge an unexpected shot of cold or hot water.**

**Labor Costs no more** to install a quality shower mixer. Powers mixers cost more. They're worth more. They're Safe 3 ways.

1. No unexpected shots of hot or cold water caused by *pressure* or *temperature* changes in water supply lines;
2. Failure of cold water supply instantly shuts off shower delivery;
3. Being thermostatic Powers mixers stop scalding caused by dead-ends in hot water lines.

**POWERS Mixers Stop Waste of Hot and Cold Water.** Bathers quickly get water at the right temperature. No waste of time. No waste of hot or cold water. Shower temperature always remains constant wherever bather wants it.

*"Keep Everybody Happy" with Powers Regulated Showers*

1333 Spring St., Atlanta, Ga. — 101 N. Elm St., Greensboro, N. C. (b34d)

Established in 1891 • THE POWERS REGULATOR COMPANY • SKOKIE, ILL. • Offices in Over 50 Cities

2. To the understudy
3. To the Company

d. How to get an understudy

e. Disadvantages of having an understudy.

Items listed under these headings furnish a valuable guide for further training.

Step One having been adequately handled, the hardest part is still ahead.

It must be remembered at this point that we are not teaching the Supervisor *one* job, but a whole series of jobs.

### Demonstrate Operation

STEP TWO requires that the person doing the training take the learner completely into his confidence, and impart to him *all* his "trade secrets." Human nature rebels.

Precept, discussion, example—precept, discussion, example—over and over, with frequent reference to results of previously discussed actions or decisions—these are the only sure methods for handling Step Two.

"Show, tell, illustrate each move.

One step at a time.

Stress key points, safety factors.

Slowly and patiently.

No more than he can get at one time.

Repeat the demonstration."

When changes are to be made, or decisions given—major or minor—talk to him—tell him—

WHAT is to be done

WHO is going to do it

WHY it is to be done (What results are expected)

WHEN it is to be done (timing is important!)

HOW it is to be done (approach—direct — indirect — suggestion—command, etc.)

WHY it is to be done that way, and later

DID YOU GET THE RESULTS YOU WERE AFTER?

And if not, then WHY not?

Conferences on various phases of the problems of getting along with people can be very helpful at this time—but *no* class-room work can take the place of actual problems discussed, along with explanation of what action is to be taken, and why, and later analysis of results achieved. If by any chance the trainee himself should become a problem, and can later be shown how he was handled, and why, the lesson will be doubly impressive.

This step can merge into, and overlap Step 3.

### Application of Tryout

STEP THREE is begun by changing from leading discussion to listening. The trainee must be encouraged to state his views—and defend them. His opinions must be given more and more weight, and his decision on action to be taken accepted if at all possible.

This phase is very difficult for the person doing the training, since it involves allowing the trainee to carry out his own ideas, even though they may seem to be not quite right. Yes, even though the action proposed seems certain to cause some friction.

For how else *can* he learn?

And sometimes the trainee's idea will turn out to have been best, after all, leaving the leader wondering—*Who* is learning?

### Follow-Up

STEP FOUR is the most difficult of all. The trainee must simply be told what is wanted and then allowed full control of the job, with minimum direct supervision—and no advice until asked for. Naturally, he cannot be allowed to make any serious mistakes, but he must be given all the leeway possible.

It should be obvious that all Four Steps will be going on concurrently. Minor details will be cleared and passed on for handling long before many other items have progressed beyond Step Two.

Conferences on giving orders, preventing waste, etc., are helpful all along the line for instruction and orientation. However, the conference that winds up with the question "Who can do something about it?" with only one possible answer can get pretty boresome. It would be better for the conference leader to summarize the weaknesses listed and answers suggested; then close with some statement such as "it looks like we *all* have a job to do here."

Throughout the training period, example is the most effective teacher. If the trainee is expected to be diplomatic, friendly and helpful in his dealings with subordinates, then it is essential that he be treated that way throughout the training period and beyond. This does *not* mean that he must never be "brought up short." There are times and places where this technique, also is essential. He should be acquainted with it.

Every supervisor, or potential supervisor would be in training, and every supervisor a training instructor at *all* times. The job is never done.

But unless we all maintain a real interest in all understudies, and have a sincere desire to see them do and obtain the very best they can, our training efforts are doomed to failure from the start.

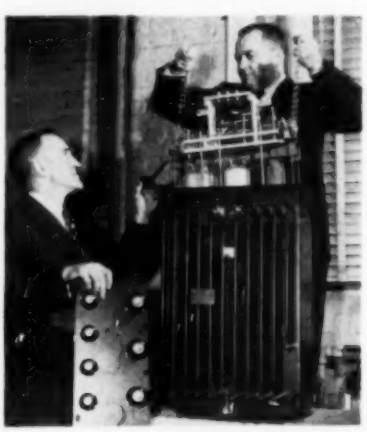
---

## Training Draftsmen For Georgia Transformer Plant

TRAINING draftsmen, not building strong men, is the purpose of this model of a power transformer.

Built to ¼ scale, it is a replica of a General Electric Repetitive-Manufacture transformer, rated 1500 kva, 22,900 to 2520/4360 Y volts.

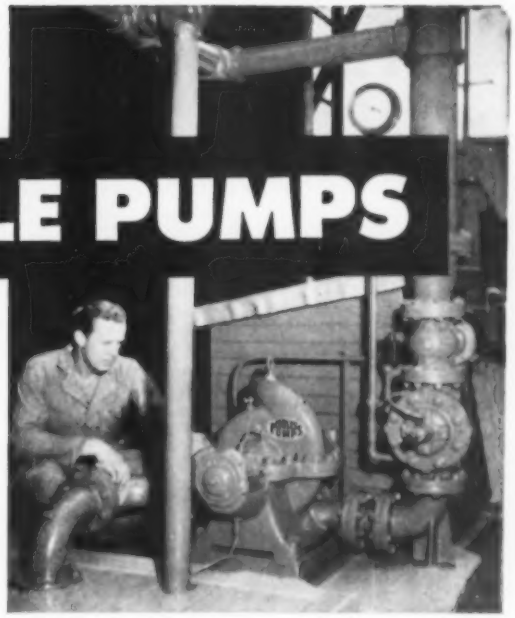
Model is being used in classes at Rome, Georgia, where General Electric is building a new power transformer plant. The multi-million dollar factory is scheduled to be completed early in 1954.



Shown with model are David D. Lawton, left, Rome, Georgia, plant manager, and T. F. Volkmer, the plant's manager of engineering.

# Your Business Depends on Pumps
## —and Peerless builds

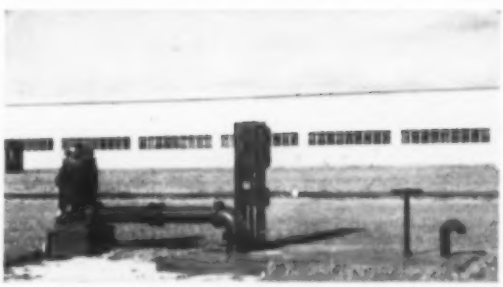
# DEPENDABLE PUMPS



**SUCH AS**

### THESE *Horizontal* BOOSTER PUMPS

Available in 2, 3, 4 and 5-stage designs for high head pumping. These Type TU pumps handle water and process liquids. Capacity range: to 3500 gpm; head range: to 1600 feet; hp range: to 350 hp. Pumps are of horizontal split-case design for easy maintenance. Quality construction throughout. The pump shown is operating on a cooling tower system. Request Peerless Bulletin B-1400 for complete Type TU pump details and description.



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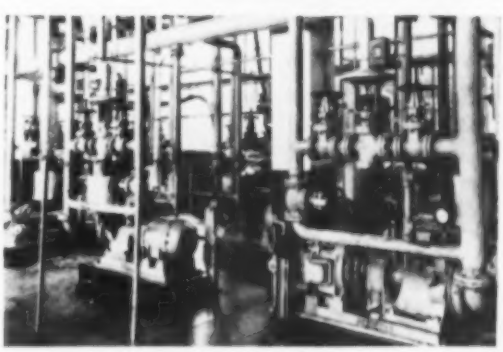
### THESE *Vertical* TURBINE PUMPS FOR PLANT WATER SUPPLY

Peerless is America's largest selling vertical turbine pump. Here's why. Peerless offers many "years ahead" features in design and construction *plus* the widest range of sizes, capacities, heads, horsepower, from which to select the right pump for your water lifting job. The pump shown is one of 23 used to supply water for an ethical drug manufacturer. This type of pump is also used with modifications as the plant's fire protection pump. As such it has full approval of the Underwriter's Laboratories Inc. Request Bulletin B-141 and Bulletin B-152 describing this type of pump for these applications.



**SUCH AS**

### THESE *Horizontal* PUMPS FOR GENERAL PURPOSE PUMPING

One of the broadest ranges of horizontal pump types, sizes and horsepower is offered by Peerless in its face mount and flexible coupled end-suction Type PE and PB pumps. This line is the famous Peerless Fluidyne line. Widely applied to hundreds of water handling services where the combination of dependability, efficiency, economy, good appearance and compactness is available in one pump. The Type PB pumps illustrated are installed for a tire manufacturer and are used to move the hundreds of tons of water required daily for plant processes. You can buy and apply this line of pumps right from Peerless Bulletin B-2300. Request it.

PEERLESS PUMPS fmc FOOD MACHINERY AND CHEMICAL CORPORATION

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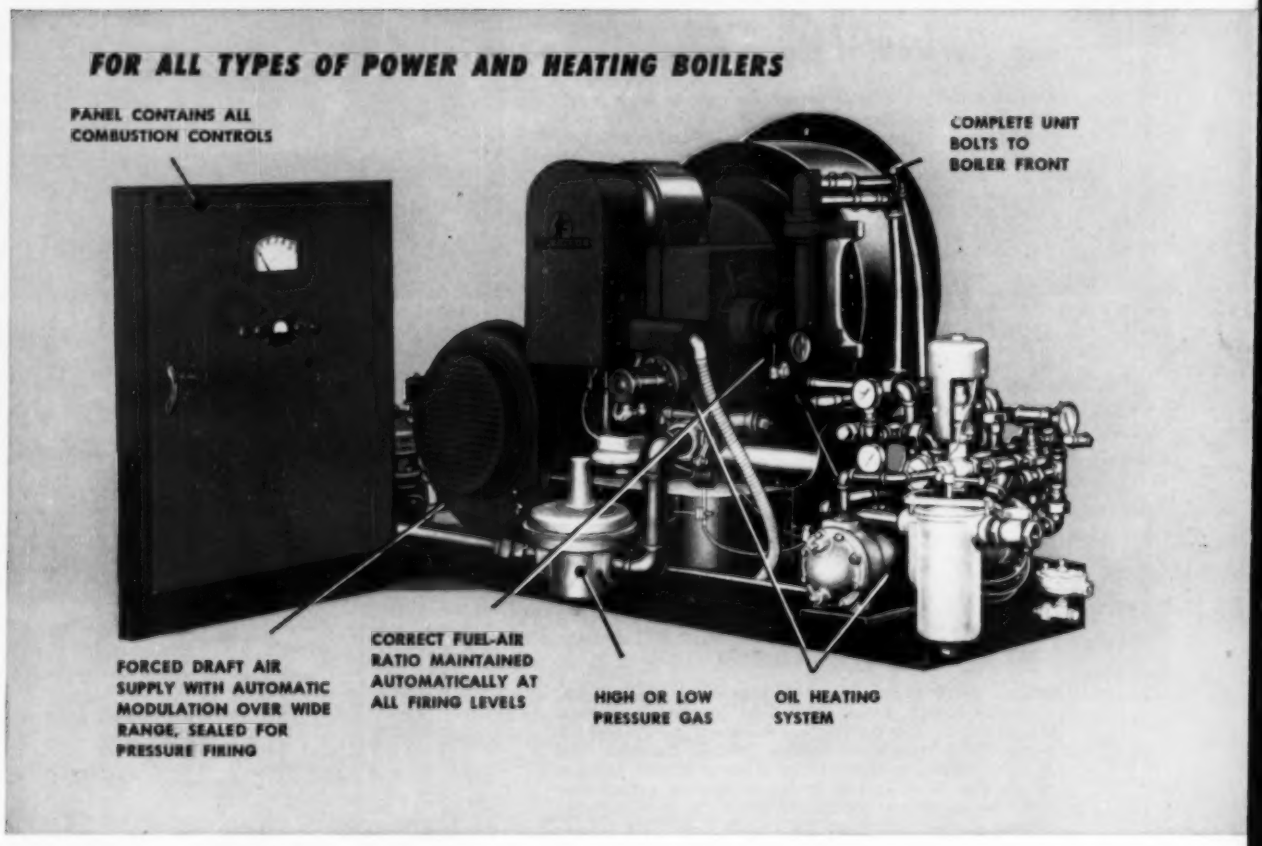
# "Packaged" for better at lower cost IRON FIREMAN


FOR ALL TYPES OF POWER AND HEATING BOILERS
PANEL CONTAINS ALL COMBUSTION CONTROLS
COMPLETE UNIT BOLTS TO BOILER FRONT
FORCED DRAFT AIR SUPPLY WITH AUTOMATIC MODULATION OVER WIDE RANGE, SEALED FOR PRESSURE FIRING
CORRECT FUEL-AIR RATIO MAINTAINED AUTOMATICALLY AT ALL FIRING LEVELS
HIGH OR LOW PRESSURE GAS
OIL HEATING SYSTEM

## Engineered as a single complete unit

This Iron Fireman package unit is much more than a conversion burner. It's a complete combustion system in which all elements are correctly balanced and integrated—a thoroughly engineered firing plant. It includes burner (for oil or gas or both), fuel system, forced draft air supply, control panel, and pre-formed refractory combustion throat. Installation requires little more than bolting the entire unit to the boiler front and making service connections for power and fuel.

To the user this means an attractive saving in installation time and cost. But even more important, it means a factory tested and assembled unit instead of a locally assembled job. It means dependable performance and high operating efficiency, with substantial fuel savings. It's the *smart* way to modernize your boiler room.

Get in touch with your Iron Fireman dealer, or mail the coupon on the opposite page for complete information.

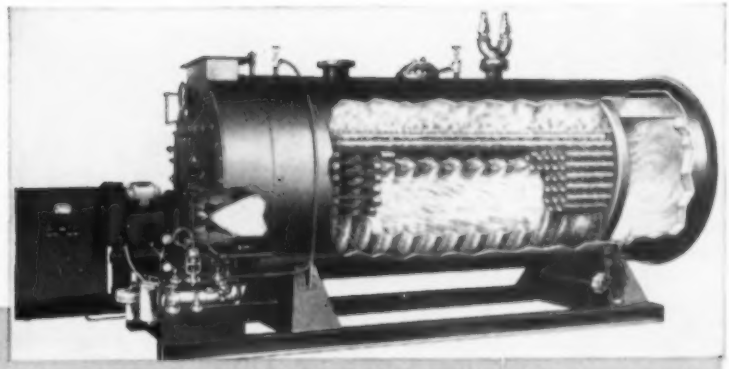
THE IRON FIREMAN

**Iron**

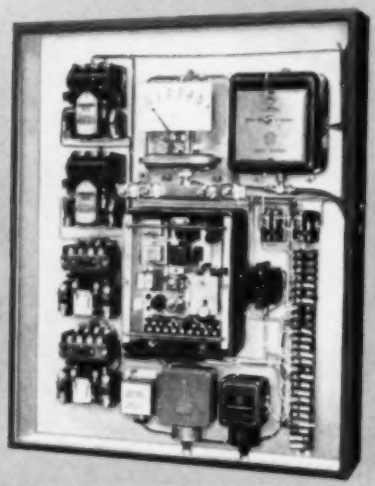
**OIL, GAS AND COAL FIRING**

# firing

## OIL, GAS or OIL-GAS COMBINATION BURNER UNIT



Cutaway view of packaged boiler-burner unit consisting of Scotch marine boiler with Iron Fireman combination Gas-oil forced draft burner. The shift from one fuel to another is accomplished quickly with no sacrifice in firing efficiency.



### WIRED, TESTED CONTROL PANEL

Control panel is totally enclosed, with all instruments wired and tested at the factory. Entire wiring system is coded, with varicolored wires and numbered terminal strip inside panel. An indicating meter on the panel door shows the condition of the control system at all times. Indicating lights on panel front show operating status of unit at a glance. Green lights show motors in service; red indicates safety lockout.

### IRON FIREMAN ROTARY OIL BURNER

The oil firing unit is the Iron Fireman rotary cup oil burner which has an outstanding record of reliability in precision firing of hard-to-handle heavy oils. Heart of the oil control system is the Iron Fireman Oil Volumeter, a variable volume metering pump submerged in the oil reservoir, which delivers the correct volume of oil to the burner head with extreme accuracy, regardless of changes in oil viscosity. Burns any grade of oil, from lightest to heaviest, without special adjustment.

### REFRACTORY COMBUSTION THROAT

The combustion throat, with preformed built-in refractory, is an integral part of the burner unit. Both primary and secondary air are admitted to the combustion chamber through this throat, eliminating the special brickwork required by the usual conversion burner and greatly improving the air-fuel mixture. Oil cup is in the center of the refractory disc, which also shields the gas jets against the radiant heat of the furnace. Adjustable inlet vanes control the shape and rotation of the flame to match the requirements of the firebox or firetube.

## QUICK CHECK ✓ POINTS

1. Assembled and tested at factory instead of on the job.
2. Applicable to practically all types of boilers.
3. Continuous high combustion efficiency.
4. Forced draft; no high stack—requires only vent pipe.
5. For either gas or oil. Combination burner quickly shifted from one fuel to another.
6. Burns low-cost heavy oils (No. 6 or any lighter grade).

# Fireman

**FOR HEATING, PROCESSING, POWER**

Iron Fireman Mfg. Co. 3051 West 106th Street, Cleveland 11, Ohio. In Canada, write 80 Ward Street, Toronto, Ontario.

Please send me literature giving full information on the Iron Fireman "packaged burner" unit.

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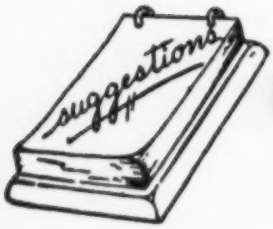



# HELPING the *MAN-IN-THE-PLANT*

***ideas . . . tools . . . methods . . . devices***

## Sharpening Carbide Tipped Tools By The Coated Abrasive Belt Method

*Manufacturer's six-month progress report: better belt life than expected . . . limited to final sharpening . . . belt lubricant advisable . . . sharpening turning tools of high-speed steel*

USE of coated abrasive belts to sharpen tungsten carbide tipped tools, introduced late in 1952, has been emphasized in recent weeks by stiffening government restrictions on allocation of industrial diamonds. The new sharpening method, developed by Behr-Manning Corporation and Fenlind Engineering Company, has been accepted by many plants as the standard means of maintaining cutting tool performance.

The first six months of widespread experience with the abrasive belt method not only proved it practical, but also expanded its scope of usefulness, and resulted in numerous refinements.

**Belt life** has proved better than development engineers had anticipated. Where normal rough grinding techniques are employed, belt life, in terms of cost, averages approximately one cent per tool sharpened for ¾ in. to 1¼ in. tool bits; and one-half cent per tool sharpened for ¼ to ⅝ in. bits.

A manufacturer of heavy equipment claims to be sharpening approximately 150 tools per belt. To achieve this extended belt life, a three-step sharpening process is used. The first step is a rough grind on a 60 grit silicon carbide wheel, dressed with a star dresser. The second step is an intermediate rough grind made with the same wheel redressed with a diamond point. The intermediate grind obtained with this procedure approximates that produced by a 100 grit silicon carbide wheel. In the third step the rough ground tool is finished on the 150 grit coated abrasive belt.

Experience shows that the abrasive belt method is properly limited to the final sharpening process. It is not practical to use it for roughing or shaping tools. These operations should be done on silicon carbide wheels.

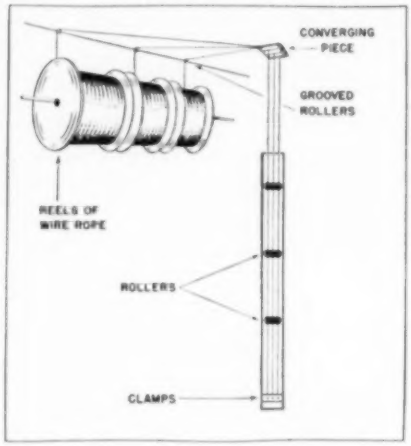
However, the belt method produces a **smoother and longer lasting cutting edge** on a tungsten carbide tipped tool than can be produced with other sharpening methods. Field reports indicate that the sharper cutting edges last longer and the well formed nose radius produces a finer finish on the work.

Accumulative experience proves conclusively that a **lubricant** should be used on the belt. The lubricant appreciably increases belt life, and more important, it improves the finish on the tool. A new grease developed especially for use on carbide tool finishing belts has been introduced by Fenlind Engineering Company.

Several manufacturers who originally bought the abrasive belt machines to sharpen tungsten carbide tipped tools now also use their machines extensively for sharpening turning tools of **high-speed steel.** These manufacturers report that a lubricated coated abrasive belt produces much better finishes on high speed steel tools than a grinding wheel of corresponding grit. Consequently, they obtain longer tool life with tools sharpened on belts.

## Wire Rope Storage

IN THIS wire rope storage arrangement used at Du Pont's Sabine River Works at Orange, Texas, reels of wire rope are placed overhead. Pieces of pipe are placed through the reels and set on stands to allow the reels to revolve freely; grooved rollers are installed directly over the reels.

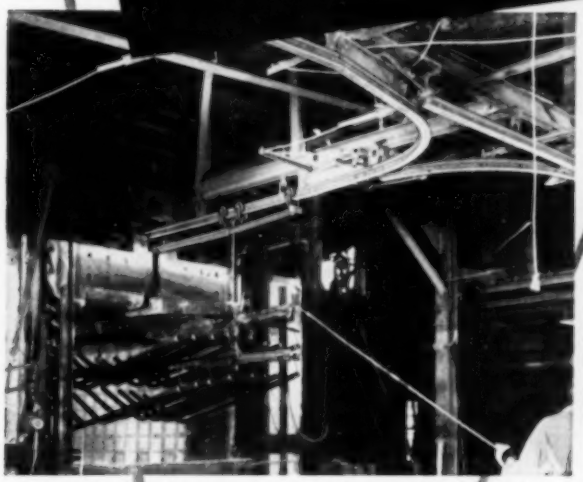



The wire ropes are run over the rollers to the "converging piece," which is a series of cylindrical rollers that keep the wire ropes separated. The wire rope travels down the beam to a point near the floor where the ends are clamped to the beam.

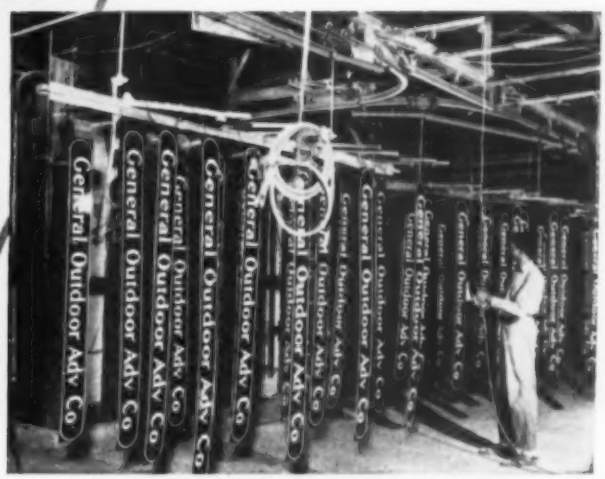
To obtain a length of wire rope, simply release the rope from the clamp, cut the desired length and reclamp the rope end to the beam.

# MONORAIL eliminates rehandling

## moves ware through all processes in porcelain enamel plant



MonoRail over furnaces allow rapid in-out movement. Carriers made of special alloy withstand temperatures up to 1800° F.




MonoRail carries ware throughout entire plant with no rehandling from special carriers.

From start to finish, spraying to drying to firing furnaces and finally to storage one single MonoRail system provides a continual flow operation at this porcelain enamel plant. The same racks loaded at the spray booths carry the ware into and out of firing furnaces. Many of the handling operations once unavoidable are now eliminated. Savings in labor alone has fully justified the investment in this system. And true of all American MonoRail Overhead Handling Installations is the extremely low maintenance cost.

Why not let an American MonoRail engineer give you all the facts about savings and advantages?

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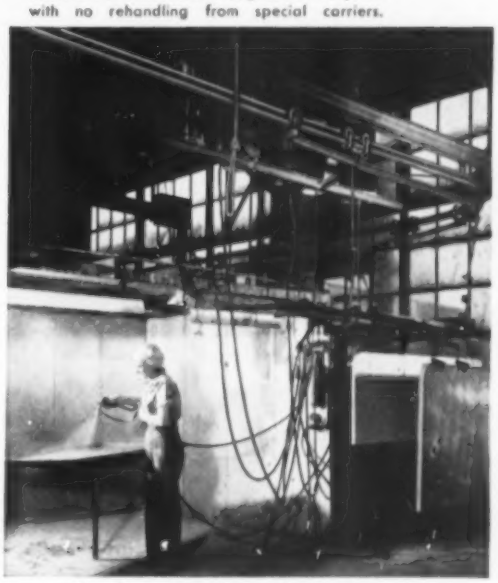

Ground coat as well as a large variety of colors are used. Ware is hung on special MonoRail carriers after spraying.

AMERICAN OVERHEAD HANDLING EQUIPMENT

**MONORAIL COMPANY**

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The Accelator combines – in a single unit – mixing, coagulation and solids separation. It occupies a fraction of the space required by old style, slow-rate treating plants and greatly reduces installation costs. Softening, clarification and stabilization plus highly efficient algae and bacteria removal are obtained at the highest flow rates because of the Accelator slurry recirculation and dynamic separation. For full details send for your copy of the informative 28-page Accelator bulletin.

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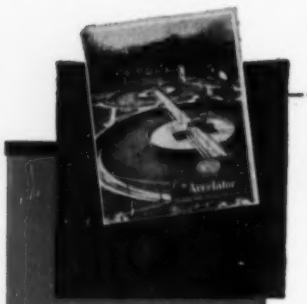

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## Tool Steel Blades Replace Flame Cutting

A Southwestern industrial plant —producer of busses, railroad caboose cars and streetcars—was making tank treads by flame cutting the sections and then grinding off the bead.

After turning out several thousand parts, the firm realized that production was too slow and costly. Flame cutting required one tank of acetylene gas and several tanks of compressed air every day.

Finally, the forge shop foreman suggested trying to cut the pieces with tool steel blades. Everyone agreed that the idea was good, but there was doubt whether a tool steel could be found that would be tough enough to take the shock of the heavy $\frac{3}{8}$" thick cuts in "I"-beam sections without breaking or crumbling.

### Improved Method

The company made shear blades from various types of competitive oil-hardening steels, with little success. None of the blades could produce more than 40 to 50 treads without breaking.

Then the plant tried Carpenter R. D. S., a tough oil-hardening tool steel produced by The Carpenter Steel Company. The first set of trial blades produced over a million treads. None of the cutting edges chipped, and production records show the blades made an average of 50,000 treads per sharpening. Today the tools are still as good as new.

In addition to the shear blades used on this job, the plant made punches from Carpenter No. 11 Special, a tough-timbre water-hardening tool steel. Four holes were punched in one stroke.

While the company's best production from an ordinary straight carbon steel was 200 to 300 holes, the No. 11 Special punches banged out some 45,000 parts between grinds. A simple clean-up grind on the cutting edges of the No. 11 punches made them as good as new.

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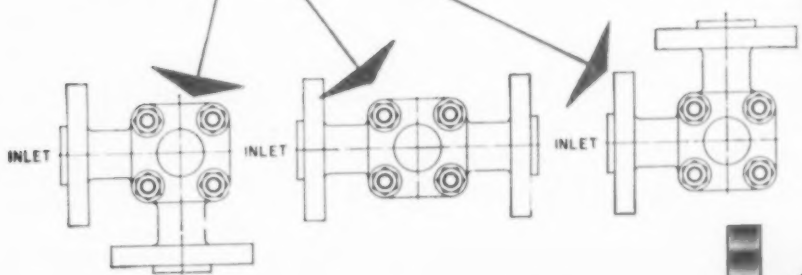
# DIAPHRAGM MOTOR VALVE

WITH Z BODY

CAN BE EASILY CONVERTED TO OFFSET ANGLE BODY



TYPE 567L
with REVERSE ACTING TOPWORKS

- Split flange construction with seat ring retained in center without threads.
- Lever Valve—Micro-Plate, Micro-Form or throttle plug type lever valve with solid stem connections.
- Sizes ½", ¾", 1", 1½" and 2".
- Materials: Regularly furnished in carbon steel or 18-8 stainless. Also available in bronze, Hastelloy and monel other alloys on request.
- Standard ISA face to face dimensions—flanged only.
- Available with a direct or reverse acting diaphragm motor.

FISHER LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE CONTROL

FISHER GOVERNOR COMPANY • Marshalltown, Iowa

FISHER Since 1880

## Gang Drilling Operation

THE Enterprise Sash & Door Company, Kansas City, Missouri, has stepped up production and cut costs by relying heavily on gang drilling operations using Delta drill presses. The drill presses are set at required centers and connected by a shaft geared to the operating pinion shaft. As the operator brings down the lever, five holes are drilled simultaneously. When this particular operation is no longer needed, the shaft is removed and the units are used as individual drill presses.

## Fluid Drive

WHEN new conveyors for handling pulpwood logs from R.R. cars were installed in the woodyard of a large paper mill in Florida, each was equipped with a Link-Belt 30 hp Electrofluid Drive. This drive not only reduced the required horsepower from 40 hp, which was required for the older conveyors, to 30 hp, but assures easy starting and smooth running, with minimum consumption of power, regardless of magnitude of load of conveyor chain and logs to be moved. Fluid drive also affords overload protection without the use of shear pin. Other drive components include an L-B enclosed herringbone gear and encased roller chain.

## Woven Wire Sling for Heavy, Bulky Loads

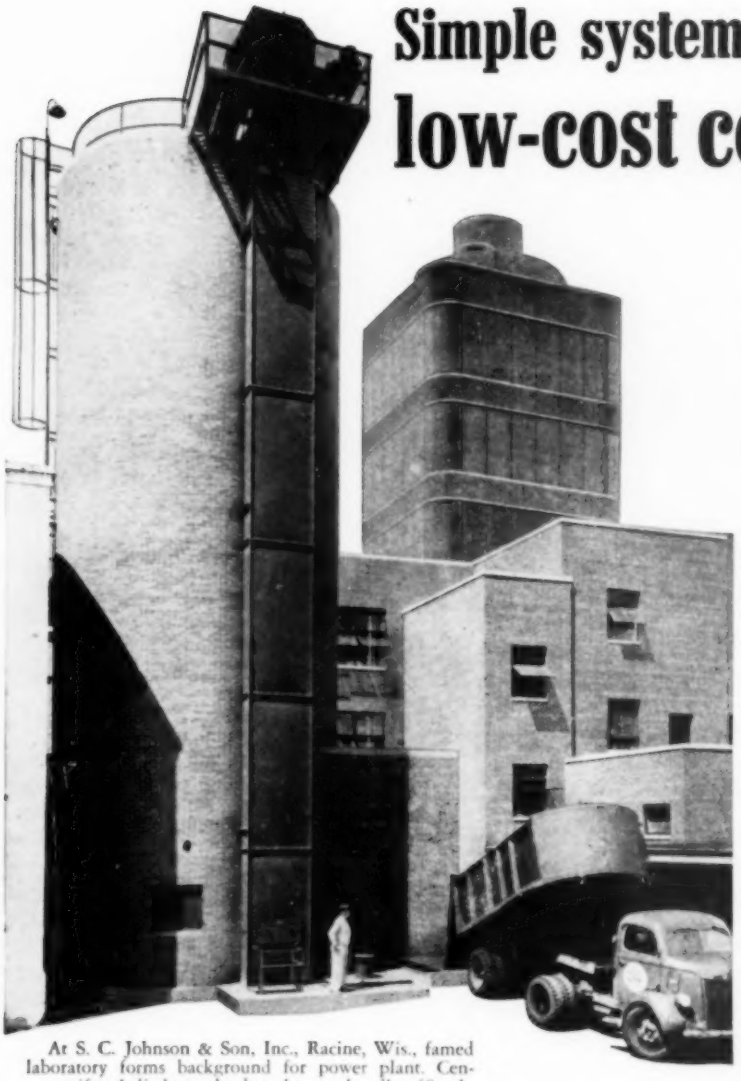
THE Herr Electric Company, Baltimore electric motor repair shop, has been using Gripper woven wire slings for over a year for handling heavy, bulky motor parts through the repair steps.

The problem of positioning the armature in a lathe formerly required at least two men, sometimes three, for larger units. The types of slings previously used were likely to slip, dumping the armature onto the floor and endangering the operators. Gripper woven wire slings, however, allow one man to do the work—note illustration. Because they grip the load firmly at all times, they have eliminated the danger of slippage and injury to the part or the operators. The operators responsible for the machining estimate that this method saves at least half the time required to position the armature over the type of sling previously used.

Because the armature is gripped tightly by the sling, difficulty in positioning it in the lathe is completely eliminated. There is no danger of cutting the edges of the armature as is the case with other types of sling.

Gripper sling being used in this Baltimore motor repair shop is a product of The Cambridge Wire Cloth Co. Woven wire construction does not present a smooth continuous surface that can become slippery from grease used on the part handled. Although a noose hitch is shown here, the same sling may be used in a basket hitch, both handles on the hook, for handling other types of loads.

# Simple system spells low-cost coal handling for small power plant



At S. C. Johnson & Son, Inc., Racine, Wis., famed laboratory forms background for power plant. Centrifugal discharge bucket elevator handles 40 tph.

## LINK-BELT equipment at S. C. Johnson & Son, Inc. provides clean, efficient operation

THE compact, economical coal handling provided for the makers of Johnson's wax is typical of hundreds of Link-Belt power plant installations. Large or small — your plant, too, can get the added efficiency of modern, mechanized equipment.

Link-Belt's experience is based on years of success in meeting every type of coal handling problem. This vast background, combined with a complete line of coal handling equipment, is your assurance of a system that's right for your needs. And Link-Belt's quality products have earned a reputation for dependable, long-life service. See your nearest Link-Belt office for a copy of Book 2410, showing many typical, modern power plant layouts.

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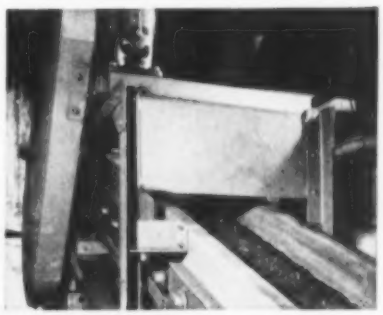
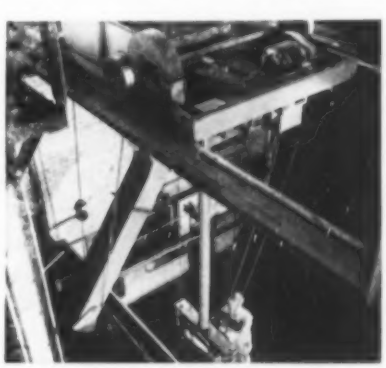
COAL HANDLING EQUIPMENT

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices in Principal Cities. 53.339



Apron conveyor loads bucket elevator. Live or dead storage is fed by elevator.

From elevator, coal is moved by 12 in. screw conveyor atop storage silo.



Weigh larry delivers coal from discharge chute to three stoker hoppers.

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## Exhaust Pipe Cleaned

AKANSAS CITY automobile fabricating plant was getting fouling from paint in a sheet metal exhaust pipe leading out of a spray booth. Cleaning equipment for the job had to be light to avoid buckling the sheet metal and the mechanical unit selected had to be non-sparking because of the inflammable paint.

Plant maintenance engineers solved the problem by using a small diameter ECT motor with an aluminum sleeve (equipment of Thomas C. Wilson, Inc.) and a swing flame brush with beryllium copper refills.

## Dust Recovered and Salvaged

DUST produced by concrete manufacturing can be bothersome, but the cost of abating a dust condition need not be expensive. The experience of Sarasota Concrete Co., Sarasota, Florida, a combined block and readymixed concrete plant, has been that the collecting equipment can be amortized by savings from reclamation and reuse of material that would otherwise be lost to the atmosphere. Equipment such as a Besser mixer, and dust producing operations like cement batch weighing and the discharge of aggregates and cement into transit mix trucks are ventilated by one cloth-tube-type collector manufactured by American Wheelabrator & Equipment Corp.

Efficient hoods on each piece of equipment pass air at high velocity, to corral the dust created. This air is then filtered by scores of cloth tubes in the collector which trap even the finest particles of dust at better than 99% efficiency. At periodic intervals, the tubes are mechanically shaken to dislodge the collected dust, which is returned to the mixer. Such quantities are reclaimed that it is estimated savings in material costs alone will pay for the collector in less than two years.

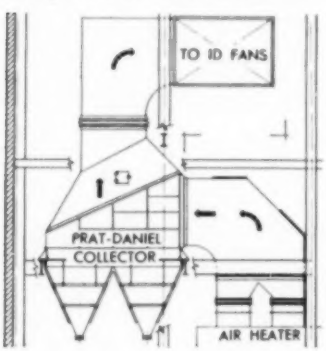
## Exclusive Prat-Daniel Unibloc Construction Reduces Erection Costs

For assured efficiency, Prat-Daniel Dust Collectors were chosen to handle a 500,000 lbs. per hour continuous steam load on this installation.

Minimum space requirements were made possible by the small tube diameter. This feature also is responsible for the exceptional efficiency of these collectors. Greater centrifugal force is realized in a small diameter tube, increasing collection efficiency in the finer particle range below 20 microns.

Assembled in complete Unibloc sections at the factory, Prat-Daniel Collectors require less time for erection in the field. They are well known for their long life. Tubes examined in other installations after a period of ten years showed little or no signs of wear, even though subjected to continuous heavy dust loading.

Project Engineers for Prat-Daniel, The Thermix Corporation cooperated with Burns and Roe Inc. of New York, Consulting Engineers on the Danskammer Station. Thermix are specialists on dust collection . . . why not contact them for the answer to your problem.




***Ask for the new P-D catalog 4P201***

Catalog contains charts, nomographs, tables and efficiency curves on how to select a dust collector. You will want this valuable information for your files. Write for your copy today.

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## Crate Making Method

A STEEL top table, tailored for crate-making, is forming better boxes in less time than aids previously used at Temco Aircraft Corporation.

Sam McClendon, wood shop general foreman, and Sam Adams, maintenance foreman at the Dallas, Texas plant, blended three crate-making operations into one in their 30 x 5 ft table design.

With its built-in sliding bars and frame guides, the table forms, secures and brads the variety of crate sizes required by the aircraft industry's largest airframe sub-contractor. Strict military standard specifications for packaging are more easily met and the possibility of error has been reduced to a minimum.

Wooden jigs formerly were used to shape and secure crate ends and sides during fabrication. For its 40 different crate sizes the company built 40 different jigs—temporary and time wasting forms, composed of 2 x 4's nailed to a wooden table top.

Two table operators in 30 minutes can set up, fabricate and remove for assembly a 30 x 5 ft crate side. They can build next, with no readjusting other than a shove of the slide bars, a 42 x 30 x 24 in. crate, their smallest size. Or they can divide the slide bars between themselves and fabricate assemblies for three or more different crates on the same table.

This excessive "set-up" time was what McClendon and Adams wanted to reduce. Once on the trail of a solution, they saw opportunities to lick other problems, too.

Standing three feet high, the table is surfaced with ¼ in. steel. Its top is edged with wood which is marked in inches and feet, making the table a 30 ft rule and square.

These square and rule guides can be reduced to fit any dimension by means of sliding bars built into the table. Three separate metal bars each extend one-third the length of the table and move from front to rear. They move independently, or they may be joined by press fits to form a movable fabrication form that extends for 30 ft.

Two similar bars extend from front to rear and move the length of the table. All bars travel in slots or on rails and can be secured anywhere along their travel by means of thumb screws.

## Wire Salvage Procedure

By S. H. Brown, Line Supervisor
The Potomac Edison Co., Hagerstown, Md.

A "RUBE GOLDBERG" that was designed and constructed by members of the Line Department of the Potomac Edison Company in Hagerstown, Maryland, for efficiently and quickly removing transmission lines, has recently been put into operation for salvaging wire removed from an old 66,000 volt line.

The machine, which consists of an old Buda 30 hp engine geared to rotate a shaft on which a number of wire reels are mounted is now located in a large vacant lot where the salvage work is done. The wire for salvage is strung out into a large triangle with 330 ft legs so that the crew performing the rewinding can keep a careful check on the line's condition. Pieces that are at least 1000 ft in length are kept and will be used in future installations. Shorter lengths are readied for sale as scrap.

Although most of the wire now being checked had been in use for over 25 years, much is still usable and through use of the "Rube Goldberg" will now be available.

During the winding operation, men are stationed at various key points around the triangle to keep the line moving at a well regulated pace. Through this system of check and recheck, the possibility of damaged conductor getting mixed in with the good is very slight.

This "Rube Goldberg" machine has been used to check about 350 miles of wire. Most of the wire is found reuseable. However, its use will be confined to short span distribution work.

Every two feet along the table's length are twin rows of holes to admit guide pins. In place, these pins secure during fabrication the crate's framing pieces—1 x 4 in. braces and uprights.

The table's two operators first adjust the slide bars to frame the dimensions of the crate side or end they will make. Then framing, already cut to measure, is selected from catalogued bins under the the table, laid in place on the table top and secured by guide pins. Slide bar thumb screws are tightened, and plywood—also pre-cut to measure—is placed inside and butted against the slide bars over the framing.

Using table-edge reference marks, workmen drive nails through plywood into framing. After penetrating framing, nails are automatically bradded against the steel table top.

Plywood fits along a recessed wood strip mounted on each slide bar top. This fit allows plywood to overlap corner uprights sufficiently to form a lock corner on all finished crates.

## Knee Operated Horn Lever

AT Du Pont's Belle Works, Belle, West Virginia, installation of knee operated levers on several fork trucks enables the operators to sound their horns while continuing to use both hands to control the vehicle.

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Like money in the bank—that's what a chimney in good repair can mean to you. As it is one of the most expensive and most important parts of the equipment of your plant, your factory chimney should have constant and careful attention.

Whether your chimney is of brick, steel, or concrete, its maintenance should not be neglected. If ignored, and allowed to become cracked and corroded, industrial chimneys can easily become operating liabilities and threats to safety.

Make sure you are not losing money by neglect of your chimney. A system of planned inspection and repair can be like money in the bank for you.

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## How One Engineer Met Steam Demand

FOUR processes were obtaining steam from the same source and the only header within the area was fully loaded. The problem of more steam was easily solved by a resourceful engineer.

Plants A and B were making a completed product in their plants, the supply lines were fully loaded and they could tolerate no additional pressure drop. While the steam temperature was not up to the standard required, they could barely get by with the properly finished product.

Plant C made a product and the tailings or residue from the product was further processed at Plant B. In order that B might take all of the residue from Plant C, it was necessary that they have an additional amount of steam. Calculations indicated that D would require 1500 lb/hr additional steam, but they were not too fussy about temperature, whereas A, B, and C would tolerate no reduction in temperature.

The resourceful engineer installed a desuperheater in the line to Plant D injecting 2000 lb/hr of desuperheating water, thus Plant D had enough steam to crowd C in supplying enough of the raw product to Plant D.

### $$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

**Southern Power & Industry**
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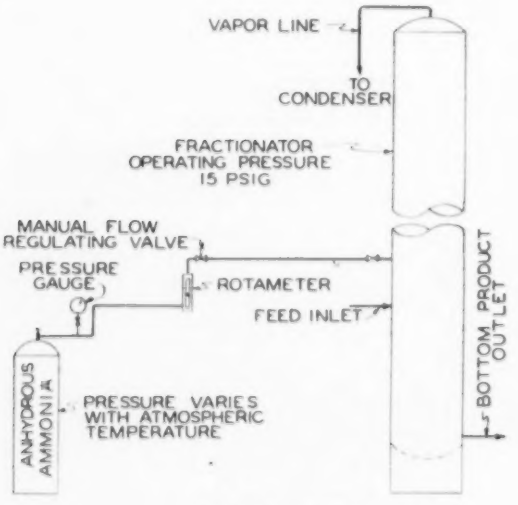
**Atlanta 5, Georgia**

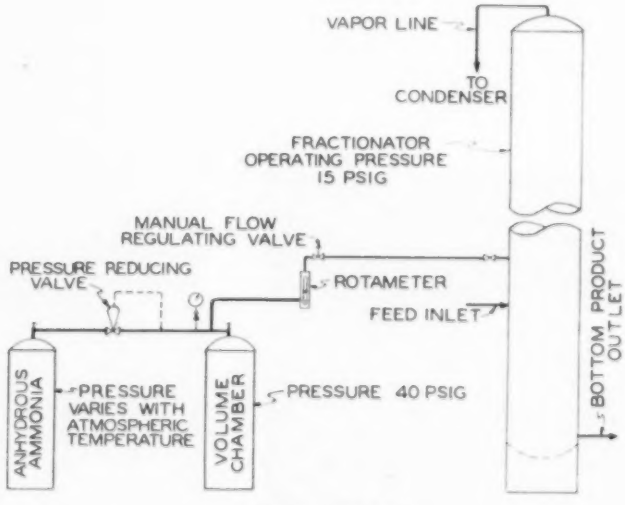
## Ammonia Injection Control System

IN a Southern refinery a small volume of ammonia is injected into a fractionating unit for pH control to reduce corrosion in condensers, accumulator, and fractionator. This application is similar to many throughout industry where it is necessary to control or meter a small volume of gas or vapor which is injected into a stream or process. For some applications the control limits are very critical, requiring elaborate control and metering equipment. For the fractionator pH control and other applications the control limits are not so critical and it is only necessary to obtain a constant rate of flow which can be readjusted and controlled by operating personnel with minimum attention.




Original Installation

The original installation for controlling the ammonia rate to the fractionating unit was unsatisfactory because variations in atmospheric temperatures caused changes in pressure of the ammonia cylinder. These pressure changes in turn caused the pressure drop across the regulating valve to vary requiring very close attention of operating personnel with frequent readjustment of the regulating valve.




Revised Installation

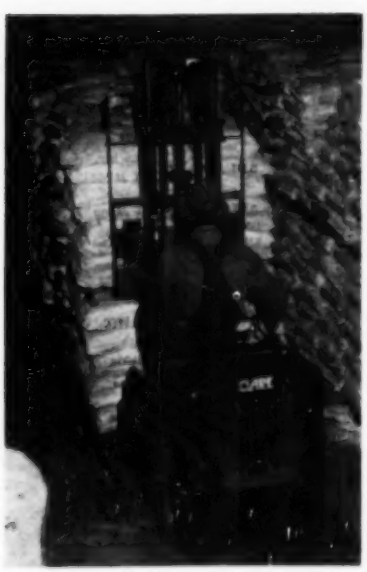
The installation was changed in a simple and economical manner, by installing a pressure reducing valve and a second cylinder or pressure tank to serve as a volume chamber. In the new system the pressure in the second cylinder or volume chamber is maintained constant by the regulating valve regardless of atmospheric temperature variations resulting in a constant flow rate with much better pH control.

## Bulk Goods Handling

ONE 2000 lb capacity, Clark fork-lift truck used in combination with standard size, slat-type, double-faced pallets, has tripled the storage space and sharply reduced the handling time for bagged chemicals and fabric bales at the Hanes Die and Finishing Company plant in Winston-Salem, North Carolina.

Previously, incoming shipments of bagged materials were unloaded, carried and piled in storage by a crew of men. When needed, the bags were taken from the stacks and carried to the Dyeing Department—a daily process. With the present system 50 lb bags are palletized as received, and the fork-lift truck takes them to storage and tiers them two loads high. The fork truck supplies the Dyeing Department with 200 bags in 20 minutes, with a saving of 4 man-hours on the operation.

Similarly, bales of gray goods are handled two and three on a pallet and the pallets are tiered in storage—and the entire job is handled by the truck operator and a helper. As a result, up to three times the number of bales can be stored in a given area.



Palletized load of bagged chemicals being picked up from storage for delivery to the Dyeing Department at the Hanes Dye and Finishing Company plant in Winston-Salem, North Carolina. Note double tiers of palletized bagged chemicals.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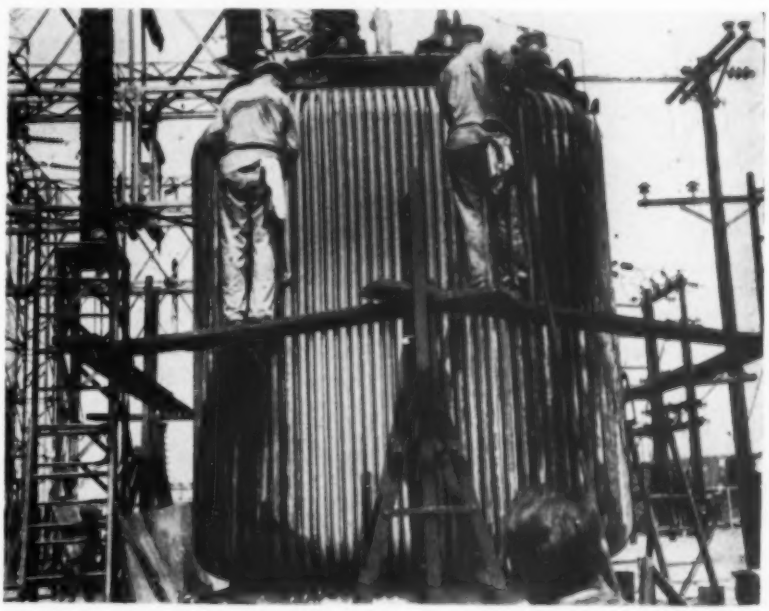

• Subox paints assure both good radiation and excellent protection for transformers and sub-station equipment. They are easily applied by brush, spray or flow-coating. Use them on your present equipment—specify them on your present equipment—specify them on your new.

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• Sub-station structures can often be painted with a single coat and a minimum of outages.

• Industrial-type fences can be amply protected with one coat applied by floor brooms.

For simplified low-cost upkeep, write for free pamphlet "Electric Light & Power Maintenance".

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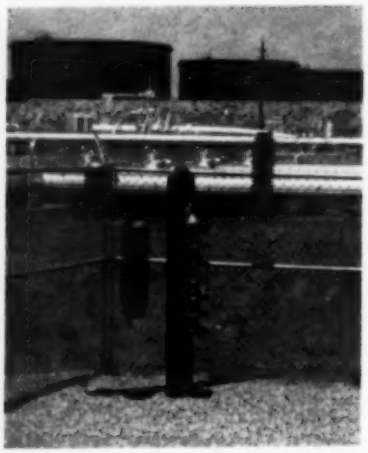
6 FAIRMOUNT PLANT HACKENSACK, N. J.

## Mounting for Spare Insulators

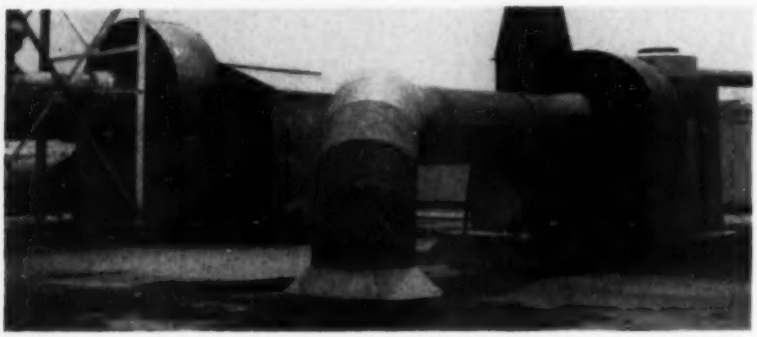
WHEN insulators fail it is imperative to have a replacement handy, and seconds saved in making the substitution can mean much to the power company.

On one substation a short post is set up within the enclosure, with a short cross-arm at shoulder height above the ground. On this post and arm are suspended one each of the various sizes and types of insulators used in the substation. It is very easy to select the proper replacement, and simply by unhooking it from the post, have it ready to transfer to the required mounting on the system.

With the insulators set within



the enclosure, they are safe from molestation, and can readily be inspected as necessary.—*Elton Sterrett, Houston, Texas.*



## Pneumatic Conveying

AT THE Lane Company (makers of chests, tables, etc.) in Altavista, Va., they have a joke they like to spring on visitors. "Here at Lane," they will tell you, "we use everything but the breeze in the trees."

What the Lane people are referring to is their system of Westinghouse Sturtevant fans which pick up waste sawdust and boardends from various machines throughout the plant and deliver them to centrally located storage bins.

Basically the Lane set-up is one of pneumatic conveying—using air to do the work. Shapers, saws, planes, etc. are hooded and refuse chips and sawdust are sucked up by Sturtevant fans and piped to a localized collector on the roof.

Westinghouse-Sturtevant fans like these "air express" waste material from machines in Lane Company's manufacturing areas to centralized collection bins. Wood waste is used for fuel in the power house and for "Lanewood", a pressed, warpless product used for inside panels of chests and tables.

Other Sturtevant fans relay this collected refuse through piping runs, some as long as 350 ft, to central storage bins. Still other fans relay the material once again to furnaces in the Lane Boiler Room. Company officials estimate that fuel savings, effected by burning waste, run as high as $100 a day.

## Truck Unloading Time Reduced

TO ANSWER the demand for faster, more accurate service, the Brunswick Pulp & Paper Company of Brunswick, Georgia, has installed a 30 ton capacity Motor Truck Scale with the latest type printer and dial mechanism (Printomatic) to weigh the incoming truck loads of pulp wood.

The scale is a Fairbanks, Morse, 30 ton capacity motor truck scale with concrete deck and was originally equipped with a type registering beam to print the weights on a single ticket. While this was accurate enough, the paper company felt that it had a definite need for faster weighing equipment and that their suppliers were entitled to see the weight as the truck was weighed and to have a printed record of the weights.

Brunswick Pulp & Paper Company's publication *"Pine Chips,"* tells how this scale is used to give faster service and to promote the good will and confidence of the producers who furnish the mill with pulpwood.

"When loaded trucks enter the wood yard they are first weighed, and the weighing machine stamps the weight, the date and the hour entered. The scalers then write in the name of the producer, the county in which he operates and the land on which he is cutting. They write also the kind of wood on the truck and the place the wood is unloaded, because one of the scaler's duties is to direct the truck driver to a crane for unloading.

"When the truck leaves the yard empty it is weighed again and the machine stamps the weight and the hour leaving.

"The machine makes three copies of the weighing ticket, one copy going to the trucker for the wood producers record, and the other two to accounting.

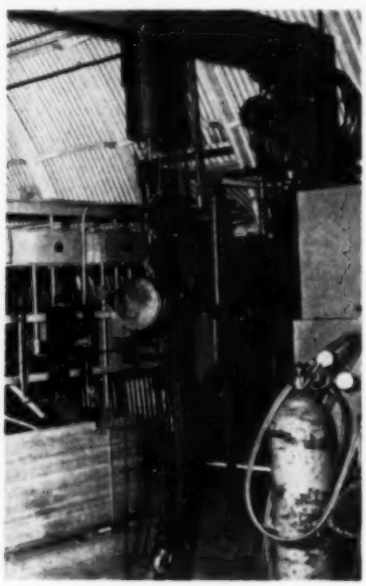
"Use of this weighing system eliminates for the most part, errors in human judgment and provides for fairer and more accurate scaling. Producers like the weighing method and are also interested in the time saving value. Scaling time is cut by 50% over hand scaling.

resulting in reduced unloading time for trucks.

"The accounting department also saves on the weighing-ticket system, since by the use of cards in the tabulation, they can more rapidly compute the amount of wood brought in and the payment demanded."

## Chain Fall Tester

THIS chain fall tester was designed at the Du Pont Sabine River Works at Orange, Texas. One end of the Dillon Dynamometer is attached to a $1\frac{3}{8}$" eye bolt which is placed through and attached to a $\frac{3}{4}$" pipe support spring inside a section of 8" pipe.



The chain fall to be tested is mounted between the Dillon Dynamometer and the ring imbedded in concrete. Desired strain is then placed on the chain fall. While operating the chain fall up to the test strain, the operator determines by "feel" if the internal mechanism is defective.

A mechanic skilled in rigging can determine easily and quickly whether the chain fall needs cleaning, has a bent shaft or has a faulty brake.

**Many of these modern procedures and improvements, plant tested in Southern and Southwestern plants, can be put to work towards increasing production in your own plant.**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## Centrifugal Pump "Totem Pole"

*(Starts on page 72)*

plants but in different locations in the same plant. Because of this, the plant engineer must always analyze conditions in his own plant, then develop a program of procedure and records to meet his particular needs.

### Trained Men Valuable

The preventive section of the program should apply to both operating and idle pumps. Two very important elements are well trained operators and well trained maintenance men.

The centrifugal pump is a relatively simple machine and becomes complex only when we inject the theory of hydraulic design into operation and maintenance. Actually the basic principles governing its performance and operating characteristics can be explained clearly and are easily understood by both operating and maintenance personnel.

The value of training these men is now recognized by all industries and it is included not only as a "first" but as a "must" in preventive maintenance. It pays dividends because the trained man becomes a combination trouble shooter and preventive maintenance man. He will be more careful in his routine checking and inspection of operating units, particularly of one that shows signs of distress.

Unless there has been a change in plant operation, a drop in capacity, a drop in discharge pressure, or an increase in the power consumption of an operating pump is a sign of internal wear. Vibration, noisy operation or a sudden increase in power demand is an indication of mechanical trouble. The trained operator will not only be quick to observe such changes from normal operation, but he will know what caused the change and what action the new conditions require.

### Operating Pumps

Preventive measures for operating pumps should provide for efficient lubrication of bearings by trained oilers. The trained oiler will not overfill the bearings—overfilling causes trouble. Too much lubricant will cause leakage and overheating. This is particularly true of bearings running at high speeds where churning of the lubricant will cause bearings to run excessively hot. The temperature of the bearings should also be checked and the cooling water regulated to keep the temperature at approximately 100 F minimum and 150 F maximum. Operating temperatures of 120-130 F are usually considered ideal.

The lubrication of conventional stuffing box packing and the cooling of the stuffing box should also be checked. Shaft seals are usually cooled by the liquid pumped.

### Idle Pumps

When a pump is idle, the cooling water supply should be shut off and the cooling system drained. Cold water should not be circulated through the oil cooler or bearing jackets of an idle pump. The viscosity of the lubricating oil at low temperatures may be high enough to retard effective lubrication and cause damage to bearings during the start-up period. If the pump is in water service, the case should be drained. In locations where the temperature drops to 32 F or below, the case must be drained.

Periodic inspection should be external. Do not open a pump unless there is a drop in capacity, a drop in discharge pressure, vibration or other evidence of internal wear or mechanical trouble.

When reassembling a pump after an overhaul, all parts must be clean, particularly bearing housings and bearings. Use solvent, kerosene and clean rag, not waste, for cleaning. All abutting faces must be clean and free from metallic burrs. The shaft must be straight, and the rotating element must be both straight and concentric. Ball bearings must be straight on the shaft and square against the shoulder. A bent shaft, dirt or burrs on the face of an impeller hub or shaft sleeve or a "cocked" ball bearing will cause trouble.

## Dispatcher-Motorman Communications

TO maintain continuity of trip movements and assure maximum safety for personnel in the operation of mine locomotives throughout a modern coal mine, prompt communication between dispatcher and motormen is a vital consideration.

At the Beach Bottom Mine of the Windsor Power House Coal Company, near Wheeling, West Virginia, officials have solved the problem by the installation of a frequency-modulated voice transmission system.

With this system, the dispatcher is in continuous voice contact with six key mine locomotives that operate throughout the mine picking up loaded trips from the three sections currently being worked.

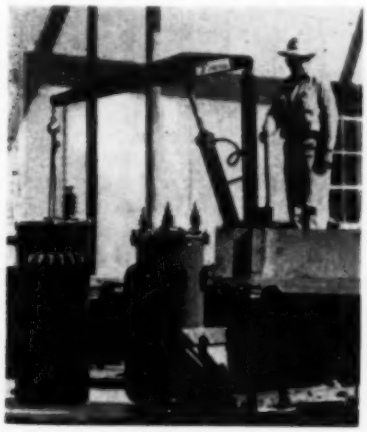
The dispatcher's office is centrally located in the mine. From this location, the dispatcher keeps the five locomotives, equipped with MSA MinePhones (Mine Safety Appliances Company), moving four-ton coal cars from butt entries to a collecting point in the main haulage where a 20-ton tandem locomotive, also equipped with a MinePhone, takes over and delivers the cars to the dumping point outside the mine.

The new installation prevents interruptions to production because it no longer is necessary for a motorman to stop each trip and telephone to the dispatcher for orders.

## Handling With Truck Crane

BY utilizing a Ruger 2 ton hydraulic truck-mounted crane, the City Public Service Board of San Antonio, Texas, recently solved

the problem of handling heavy transformers and electrical equipment from storage yard to point of installation.



Applicational view of the Ruger Equipment's 2-ton Hydraulic Truck Crane. All Ruger cranes are equipped with a built-in safety overload valve which will cut out at 200 lb over the rated capacity of the crane.

The long arm of the 4000 lb capacity hand-operated hydraulic crane reaches down, lifts the load from the ground or truck, and because of its 360 degree turn, can swing around and deposit the load on the truck bed. Rate of descent is determined by a fingertip control valve. The mast of the crane is supported top and bottom by large oversize roller radial-thrust-type bearings, which prevent bind even with capacity loads.

## Operating Report of Plant X—Texas

(*Starts on page* 54)

butterfly valves employed have not proved entirely satisfactory due to the design of the working parts.

Since turbulence is present in the valves the discs are subjected to considerable stress, and "slack" in the operating linkages finally resulted in failure of one of the valves. On future installations valves of different design will be employed. The new valves will be equipped with through-shafts of larger diameter and made of stainless steel, and the control linkages will be designed for minimum slack.


Okadee
"THE PERFECT SEAL"
WRING FIT

No magic... No magnetism... lapped wring fit of every Okadee Valve disc and seat must pass this test of a perfect sealing surface. (unretouched photo)

**... Here's What it Means to You in Terms of Valve Service**

Flat mating surfaces within .000005", or less, of every set of Okadee valve discs and seats mean absolute shut-off of any material from ammonia gas to asphalt.

How long does this seal last in service? We honestly don't know. Tests under working conditions with propane were stopped after 269,000 operating cycles when no wear or seal failure could be detected. And Okadee valves do not have to be babied in service on corrosive or abrasive materials . . . Thousands of boilers have had Okadee blow-down valves in continuous, trouble-free service for fifteen years or more. If Okadee size-pressure-temperature ranges include your valve applications, Okadee installation will end your problems of valve performance once and for all.

Okadee valves are available in single-disc (one direction) and double-disc (two directions) types; screwed or flanged; ½" to 6" in standard A.S.A. dimensions; steel or semi-steel bodies (other materials to order); stainless steel or stellite seat facings; levers, rack-and-lever, worm-gear, hydraulic, pneumatic, automatic on-off control.

Write for Bulletin 332-H today!

OKa. Okadee COMPANY
332 South Michigan Avenue • Chicago 4, Illinois

# NEWS *for the South and Southwest*

***Better production and merchandising . .***

## Atlantic Steel Adopts Modern Nail Cleaning and Packaging Operations

*Wooden nail kegs gone the way of the cracker barrel; industry trend established with automatic cleaning units, conveyor system, and fibreboard Nail Caddy.*

The adoption of the new fibreboard Nail Caddy (developed by International Paper Company's Georgetown Laboratory in South Carolina) together with the installation of a new Ransohoff nail cleaning unit, a conveyor system and automatic sealing unit make ATLANTIC STEEL COMPANY'S nail cleaning and packaging operation one of the most modern in the industry.

### Method Improvement

Although other steel companies have changed from wooden kegs to similar type fibreboard containers for bulk nail shipments, this is the first time a mill has completely abandoned kegs and made plans to package its full line of nails, rivets, and staples in cartons.

Atlantic Steel Company in Atlanta, Georgia, produces "Dixisteel" nails in a full range of sizes and types, from 20 gauge wire brads to 12 in. spikes, in bright, cement coated, galvanized and blued finishes. All sizes of nails are now processed in two Ransohoff cleaning and dewhiskering units before packaging. The new Ransohoff equipment replaces all but three of the eight nail tumblers which had been used in the cleaning operation. Only cement coated nails are now cleaned in three nail tumblers.

Each of the former eight nail tumblers had a capacity of 25 kegs for a two hour period. The first Ransohoff nail cleaning unit, placed in operation in June, 1951, averages better than 67 kegs per hour. Second unit, installed during the recent conversion from wooden kegs to fibreboard Caddy boxes was located alongside of the 1951 unit. Production from both units flows onto one main conveyor line through a "Packomatic" Caddy sealer. At the end of the conveyor, Caddys are palletized according to nail size and style.

Utilization of the Nail Caddy by Atlantic Steel introduces modern merchandising methods to the nail industry. Warehousemen find that it saves up to 25% in storage space, stacks neatly, and the top and side markings aid identification and speeds the taking of inventories.

The carton weighs three to four pounds less than the keg and is easy to handle, palletize and move with a lift truck or dolly. Greater safety is claimed because there are no splinters or protruding nails which might cut hands or snag clothes.

Modern packaging phase of Atlantic Steel's nail production line. After processing in two Ransohoff automatic cleaning and dewhiskering units, nails are automatically weighed in 100 lb lots and fed into Caddy boxes. Filled Nail Caddys move along a conveyor through the Packomatic sealer which glues both ends. At the end of the conveyor line the sealed Caddys are palletized and then moved by fork truck to the Nail Mill Warehouse and stocked according to size and style ready for shipment to customer.

Warehouse attendants find that the new Caddy saves up to 25% in storage space, stacks neatly and top and side markings aid identification and speed inventories. It is easy to palletize and move with a fork truck or dolly.

## FUTURE EVENTS
### Of Engineering Interest

**AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS,** H. H. Henline, Sec'y, 33 West 39th St., New York 18, N. Y.
**Nov. 2-6,** Fall General Meeting, Muelebach Hotel, Kansas City, Mo.
**Jan. 18-22, 1954,** Winter General Meeting, Statler Hotel, New York, N. Y.

**REFRIGERATION EQUIPMENT MANUFACTURERS ASSOCIATION,** W. A. Siegfried, Pres., Superior Valve & Fittings Co., W. Liberty Ave. & Brookside, Pittsburgh, Pa., Gen. Chm. of Exposition.
**Nov. 9-12,** Refrigeration and Air Conditioning Exposition, Cleveland, Ohio.

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS,** C. E. Davies, Sec'y, 29 West 39th St., New York, N. Y.
**Nov. 29-Dec. 4,** Annual Meeting, Statler Hotel, New York, N. Y.

**NATIONAL ASSOCIATION OF CORROSION ENGINEERS,** A. B. Campbell, Exec. Sec'y, 1061 M&M Bldg., Houston 2, Texas
**Nov. 12,** Southeast Region, Fall Meeting, Birmingham, Ala.
**Dec. 1-4,** Corrosion Conference, University of Oklahoma, Norman, Okla.
**March 15-19, 1954,** Tenth Annual Conference & Exhibition and Refinery Industry Symposium, Kansas City, Mo.

**EXPOSITION OF CHEMICAL INDUSTRIES,** Charles F. Roth, Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
**Nov. 30-Dec. 5,** 24th Exposition, Commercial Museum & Convention Hall, Philadelphia, Pa.

**PLANT MAINTENANCE & ENGINEERING SHOW,** Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
**Jan. 25-28, 1954,** Exposition, International Amphitheatre, Chicago, Ill.; and Plant Maintenance & Engineering Conference, Hotel Conrad Hilton, Chicago, Ill.

**SOUTHERN SAFETY CONFERENCE AND EXPOSITION,** W. L. Groth, Exec. Dir., P. O. Box 8927, Richmond 25, Va.
**March 7-9, 1954,** Fifteenth Annual Conference and Exposition, Kentucky Hotel, Louisville, Ky.

## Gustin-Bacon and 3M Share Glass-Plastic Pipe Work

MINNESOTA MINING & MANUFACTURING CO. and GUSTIN-BACON MANUFACTURING CO. of Kansas City, Mo., have announced an agreement whereby 3M acquires certain Gustin-Bacon Patents and inventions relating to the manufacture of glass fiber reinforced plastic pipe.

The agreement also provides that the two companies cooperate in research and development work concerned with perfecting and improving the glass-plastic pipe together with a line of fittings and couplings.

Gustin-Bacon, one of the pioneer producers and developers of glass fibers, has been actively engaged in the development of glass fiber reinforced plastics since the introduction of this new structural material during World War II.

Minnesota Mining & Manufacturing Co., best known for its "Scotch" Brand tapes, "Scotchlite" Brand reflective sheeting, abrasives and adhesives, has had extensive experience in plastics research and manufacture.


These EVERLASTING advantages give better service from

Fig. 400/6561. Duplex unit consisting of Straightway Lever-operated Valve and Angle Valve.

BOILER BLOW-OFF VALVES

When you install an EVERLASTING Duplex Blow-Off Unit, you'll find that its many superiorities speak for themselves.

The valve at the left is the EVERLASTING design that has been famous for more than 40 years . . . the valve with the drop-tight seal that actually improves with use because of its self-lapping action each time the valve is opened or closed . . . the valve that can't stick or jam because of its non-wedge design . . . the valve that opens in less than a quarter turn to provide unimpeded straight-through blow.

The valve at the right is the equally famous EVERLASTING Angle or "Y" Valve, specially designed and equipped to withstand repeated blowoff shocks, erosion and corrosion, and without pockets that might trap and hold solids.

Each of these valves . . . and all the other EVERLASTING Boiler Blow-Off valve types, fully meet ASME code requirements . . . assurance that they are properly designed and amply strong for the service.

**Write for descriptive bulletin**

Fig. 4001/6571. Duplex unit consisting of Straightway Lever-operated Valve and Y Valve.

Fig. 6571/6561. Duplex unit consisting of Y Valve and Angle Valve.

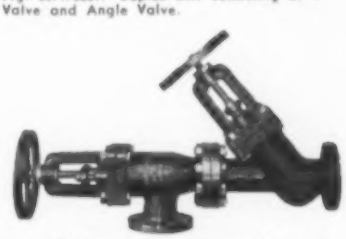


Fig. 6561/6571. Duplex unit consisting of Angle Valve and Y Valve.

**EVERLASTING VALVE CO.**
**49 Fisk Street, Jersey City 5, N. J.**

Everlasting Valves

TRADE MARK "EVERLASTING" REG. U.S. PAT. OFF.

EV-340

FOR EVERLASTING PROTECTION

# Van der Horst Corp. Continually Expanding Southwestern Cylinder Renewal Facilities

*Current production at Terrell, Texas, plant confined to renewal of aircraft cylinders; proposed expansion will handle cylinder renewal for Dieselized industry.*

More than 400% increase in processing capacity within the first 18 months of its operation still leaves the VAN DER HORST plant at TERRELL, TEXAS, unable to exceed aircraft demands. Original plans to handle all cylinder renewal for Diesel operators of the Southwest at its Texas plant (freeing the company's Olean, New York, facilities to meet increased demands there) await completion of further expansion at Terrell.

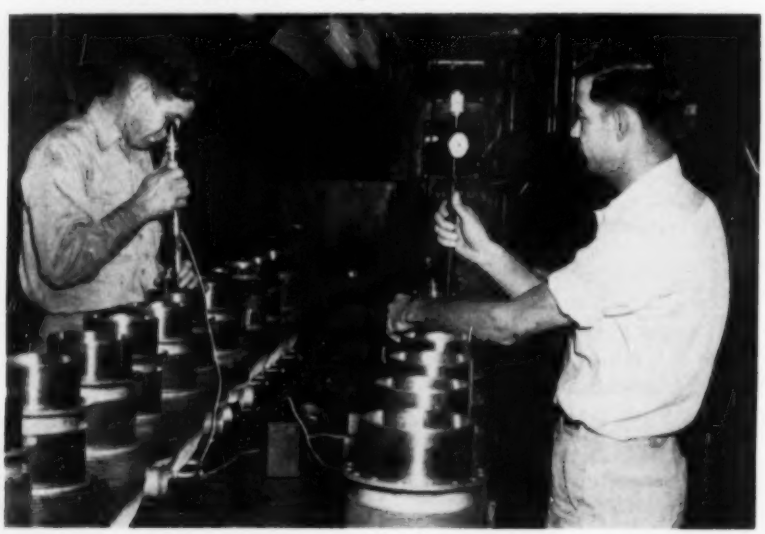
A recent announcement disclosed that additional contracts for renewal of aircraft cylinders, in a volume that will lead to redoubling of the Terrell facilities, have been added to the Van der Horst backlog. The new contracts are for renewal of aircraft cylinders with channel type Porus-Krome. As the originator of this specialized process, the company formerly devoted an entire plant to it in New York state. A year and a half ago the bulk of this phase of its work, most of which derives from aircraft rehabilitation centers of the Southwest, was made the nucleus of the Texas project.

There, the new facilities were intended to offer more rapid delivery and lowered transportation costs on renewal of Diesel liners for petroleum pipeline pumping stations, municipal and industrial power plants, railroads, and the Gulf Coast merchant marine.

## Diesel Liner Exchange

The Van der Horst process, which reverses the cumulative costs of cylinder wear by taking such items as worn Diesel liners just as they come from the engine and renewing them to original bore dimensions, has a projected innovation in development at Terrell. This is a provision for immediate exchange with pipeline pumping stations of renewed liners, ready for installation, in return for worn out Diesel cylinders to be Van der Horst processed.

Inspection operations at the Terrell, Texas, plant of the Van der Horst Corporation. At the left an aircraft cylinder is being checked for distribution and size of channels. Finished dimensions of the plated cylinders are being determined and recorded at the right.



Ultimate needs for the facility at Terrell parallel the design and equipment of the largest of the three company plants at Olean, N. Y.

At all Van der Horst plants, each liner as it is unpacked and moved into receiving inspection, is chemically cleaned and degreased. Any out-of-round condition is bored or honed out, to re-establish concentricity, and residual oil is baked out of the basic metal. Plating requirements for renewal of the liner are then set up and coordinated with the schedule of production flow.

The liners are mounted in multiple fixtures and handled through processing by overhead equipment. An electrolytic etch immediately precedes the actual plating.

Then, under careful control of all plating factors the liners begin to re-acquire the dimensions they lost during operational wear in Diesel engines.

Up to this point, the process closely parallels the specialized set-up at Terrell for renewal of aircraft cylinders. Diesel liners, however, usually require a heavy plating of Vanderloy M. This pure, electrolytic iron bonds with the basic metal of the liners and builds up, with required economy, to the thickness needed for their reconstruction.

It was the development of Vanderloy M which extended the Van der Horst process greatly beyond its former capacity to equip Diesel cylinders with the advantages of Porus-Krome. The latter is economically practical only in comparatively thin applications, on the order of 0.015 of an inch.

With Vanderloy M, even heavily rebored cylinders are returned to standard size. After the heavy plate of Vanderloy M has been developed to sufficient thickness, the processing routine is practically duplicated for application of the finish plate of Porus-Krome.

In its final phase, the deposition of chromium is halted and, in a separate tank, the current is reversed. This carries away some of the chromium, leaving the plated surface microscopically roughened.

When this surface is planed down by honing, a continuous, smooth "plateau," interspersed with depressions and fissures, remains. The depressions constitute the porosity in Porus-Krome. Without porosity, the "plateau" area, which becomes the bearing surface of the cylinder and against which the piston rings work during Diesel engine operation, is too smooth to hold oil on its surface.

## BCR Program Available

The Combustion Conference program of BITUMINOUS COAL RESEARCH, INC., that met such widespread acceptance last year is being expanded to cover a wider range of subjects. Coal industry engineers with broad experience in combustion problems will be available to lead meetings on three topics: "The Use of Over-fire Jets for Smoke Reduction," "Reducing Flue-Dust Emission from the Small Industrial Boiler Plant," and Mechanical Coal and Ash Handling for a Small Boiler Plant."

In arranging these meetings, Bituminous Coal Research, Inc., supplies the speakers, and handles publicity in advance of the meeting if requested. The speaker will use slides and models to present the information as graphically as possible. A portion of the meeting will be devoted to discussion of individual problems of those attending the conference.

Groups of plant owners, engineering societies, air pollution control officials, and coal companies will find it profitable to arrange such conferences in their city.

Interested groups are invited to contact the coordinator of the program, Charles H. Marks, Bituminous Coal Research, Inc., 980 Kinnear Road, Columbus 8, Ohio.


**STATEMENT**

of the ownership, management and circulation required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code Section 233) of SOUTHERN POWER AND INDUSTRY, published monthly at Philadelphia, Pa., for October 1, 1953.

1. The names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, W. R. C. Smith Publishing Company, Atlanta 5, Georgia; Editor, Francis C. Smith, Atlanta 5, Georgia; Managing Editor, Richard L. Priess, Atlanta 5, Georgia; Business Manager, Eugene W. O'Brien, Atlanta 5, Georgia.

2. The owners are: W. R. C. Smith Publishing Co.; Estate of W. R. C. Smith, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; J. C. Cook, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; T. W. McAllister, Windemere, Fla.; E. W. O'Brien, Atlanta, Ga.; Seba J. Jones, Atlanta, Ga.; Mrs. E. L. Philpot, Atlanta, Ga.; Richard P. Smith, Atlanta, Ga.; A. F. Roberts, Atlanta, Ga.; W. C. Herbert, Atlanta, Ga.

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E. W. O'BRIEN, Business Mgr.

Sworn to and subscribed before me this 23rd day of September, 1953.

SEBA J. JONES, Notary Public

My commission expires Feb. 23, 1954.



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*specifies*

**Richardson**

Like many progressive utilities, Delaware Power & Light Company selected Richardson Automatic Coal Scales to maintain a constant check on boiler efficiency in their new generating station. The bank of Richardson Model 39's shown now handles this responsibility.

**To both industrial and utility power generating stations, specifying Richardson means—**

1. A 24" x 24" inlet opening and 26" wide belt for maximum coal flowability.
2. All wiring and controls outside coal chamber.
3. Access doors which will not spill dust on floor when opened.
4. Beam ratio test facilities outside coal chamber.
5. Gravity operated by-pass, with no restriction of coal flow to downspout.
6. No drag links or wires attached to weigh hopper.
7. Nationwide after-delivery service.

**Latest development in the 39 Series of Richardson Automatic Coal Scales is the Model H-39 shown below. May we send you our new 16-page engineering data book on the H-39 Coal Scale (Bulletin 0352), without cost or obligation?**

**RICHARDSON SCALE COMPANY · Clifton, New Jersey**

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MATERIALS HANDLING BY WEIGHT SINCE 1902

## 35th Annual Meeting Highlights—Public Utilities Association of The Virginias

Discussions of community development, atomic energy, Federal power policies and sales problems highlighted the September 18-19 conference of public utility company executives from Virginia and West Virginia at White Sulphur Springs, West Virginia. Approximately 375 attended the two-day conference.

Utility management men heard addresses on two aspects of community development by utility companies. Speaking on "The Role of the Utility in Community Development," C. M. WALLACE, JR., Vice President in Charge of Sales, GEORGIA POWER COMPANY, Atlanta, Ga., described the experience of his company in carrying out an area development program over a period of years. He laid down two principles for successful utility development efforts. The first, he said, is that "you must not do the work for the people in a community . . . The work must actually be done by the people themselves." The second important principle is for company management to examine its motives in sponsoring a plan for community improvement. The company must not expect immediate returns but rather long range economic gains, he said.

Another approach to utility participation in community improvement programs was described in an address by W. C. HANDLAN, Manager, Territorial Development Department, MONONGAHELA POWER COMPANY, Fairmont, W. Va., and Chairman of the Association's Area Development Committee. He said that the electric utility companies in Virginia and West Virginia are cooperating through the Association to place their area development efforts on a broader base. During the past year, he said the Association had studied population trends in the two states and had published a community development manual. Titled "How's Business In Our Town," the manual is being distributed through Association member companies to civic organizations in their territories.

WALTER L. CISLER, President, DETROIT EDISON COMPANY, Detroit, Mich., keynoted the meeting with an illustrated lecture on progress toward generation of electric power with atomic fuels. He explained that although it is known that nuclear materials can be used as a heat source for power generation, a number of engineering, legal and economic problems need to be solved before commercial atomic power will be feasible. Mr. Cisler assured his audience that atomic fuels would not displace coal and other conventional fuels in the foreseeable future. He pointed out that because of capital requirements existing electric plants will not be remodeled to use nuclear fuel but that atomic power plants will be entirely new installations.

The power policies recently announced by the U. S. Department of the Interior were amplified in an address by CLARENCE A. DAVIS, the Department's Solicitor. Mr. Davis pointed out that the Interior Department is obligated by Congressional directives to carry out a number of policies with regard to the generation and sale of electricity from government installations. He summarized the duties of the department with respect to power as being that of "selling a surplus government product to benefit the largest possible number of people, giving preference to public agencies, to help recoup a government investment." Discussing power policies of past administrations, Mr. Davis said in his opinion there has been "far too much politics and far too little arithmetic in the whole affair from the beginning."

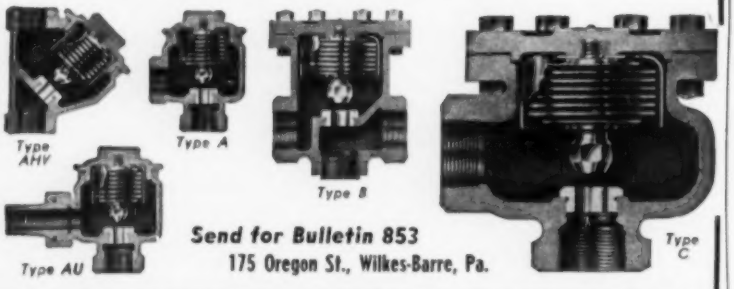
A new era in public utility selling was forecast by B. K. WICKSTRUM, Vice President, SYLVANIA ELECTRIC PRODUCTS, INC., in an address titled "Getting Back To Selling." Remarking that electric energy consumption has been doubling every ten years Mr. Wickstrum said that by 1963 electric sales might reach 800 billion kilowatt hours annually. Stepped-up selling effort and mass promotion methods will have to be used by the utility industry to reach that goal, he said. Recommendations for meeting the challenge of the present and future market included more intensive cooperation with manufacturers, dealers and distributors of appliances and equipment, and employment of better-quality, higher-paid utility sales personnel.


NICHOLSON TRAPS

SAVE CAR OF COAL WEEKLY

for This Large Steam User

Following replacement of all steam traps of various makes, with Nicholson units, an Eastern college reports: — "An average coal saving of 1 carload per week besides much better heat distribution." Credit is given the higher and more even temperatures which Nicholson traps effect. See why large industrial and institutional steam users are increasingly standardizing on Nicholsons. 5 types; for heat, power, process; sizes ¼" to 2"; pressures to 250 lbs.

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W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

At the Association's annual banquet, DEAN RUSSELL, author of "The TVA Idea" and an editor on the staff of the FOUNDATION FOR ECONOMIC EDUCATION, Irvington-On-Hudson, N. Y., spoke on "My Freedom Depends On Yours." He stressed the need for each individual having a true conception of freedom and liberty in present social conditions where freedom is restricted on many fronts.

New Association Officers: At the final business session the Association elected *Erwin H. Will*, Vice President in Charge of Operations, *Virginia Electric and Power Company*, Richmond, Va., as President. He succeeds *R. E. Hodges*, Division Manager, *Appalachian Electric Power Company*, Charleston, W. Va. Other officers elected for 1954 are First Vice President: *A. J. Bowen*, Division Manager, *Northern Virginia Power Company*, Winchester, Va.; Second Vice President: *D. B. Potter*, Vice President, *Monongahela Power Company*, Fairmont, W. Va.; Executive Secretary: *R. W. McKinnon*, Roanoke, Va.; Treasurer; *J. C. Parrott*, President, *Roanoke Gas Company*, Roanoke, Va.; Assistant Treasurer: *A. T. Ellett*, Secretary, *Roanoke Gas Company*, Roanoke, Va.

### Elliott Co.—Kansas City

One of three assistant managers recently appointed by the ELLIOTT COMPANY, Jeannette, Pa., is O. M. SIEVERT in their KANSAS CITY office.

Mr. Sievert joined the company in 1944 after graduating from the Missouri School of Mines as a mechanical engineer. After serving two years in the Navy he returned and was assigned to the Cincinnati office as a field engineer in 1947 and to the Kansas City office in January, 1953.

### Shell Chemical—Norco, La.

A substantial addition to America's supply of glycerine and Epon resins will result from a new SHELL CHEMICAL CORP. plant to be erected at NORCO, LOUISIANA.

With completion scheduled for late 1954, the new plant will produce allyl chloride and epichlorohydrin. Its output will be used to increase Shell Chemical's glycerine production by 25,000,000 pounds per year.

The Norco plant, an entirely new site for Shell Chemical, is designed to operate in conjunction with the Shell Oil Company refinery there and will use propylene and other feed stocks it produces. Employing about 150 workers initially it is expected to play a major part in the continuing growth of the New Orleans industrial area.


# BELMONT
## PACKINGS
## for WATER...STEAM...OIL...

**BELMONT 9 . . . for all hydraulic services from low pressures to extremely heavy duty, hot and cold water.**

**BELMONT 19 . . . for hot and cold water rods and plungers; low and intermediate steam rods.**

**BELMONT 30...for high pressure steam rods, expansion joints, air, and gas.**

## for better sealing—LONGER

Regardless of the temperatures or pressures involved . . . no matter what the lading . . . *your* equipment maintenance costs can benefit from longer, more dependable packing life. If you're *paying* for the best—and you probably are—make sure you *get* it by specifying BELMONT Packings in formulations suited to your particular needs.

Don't make do with the next best—*insist* on BELMONT . . . available in a wide range of materials . . . hundreds of styles and types . . . through distributors everywhere.

For technical assistance on packing specifications, write direct—ask for Catalog #40 or detail your particular problems. 4M-1

FOR MEN WHO USE WIRE MESH BELTS!

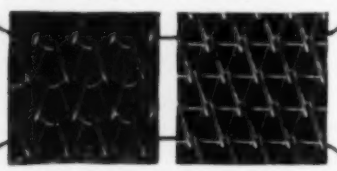
HERE'S WHY LEADING MANUFACTURERS SPECIFY "CAMBRIDGE" WIRE MESH CONVEYOR BELTS.

ACCURATE CONSTRUCTION—every step of the construction of your belt is carefully controlled so that the finished belt meets specifications for size, mesh count and mesh opening. Even the welds at the edge of the belt are specially inspected to give you maximum protection at this most vulnerable part of the belt.

RANGE OF SPECIFICATIONS—whether you're handling delicate lightweight loads, such as synthetic fibres, or heavy, bulky loads such as bagged cement, there's a Cambridge wire belt specification to meet your needs. Even processing through heat, cold or corrosive solutions is a snap when the proper metal or alloy is chosen for fabricating your belt.

EXPERIENCED ENGINEERING SERVICE—the combination of trained engineers both in the Cambridge plant and on our Sales Staff is your assurance that the belt recommended for you is the right belt. Cambridge engineers can assist you in any phase of conveyor belt usage . . . conveyor design, plant layout, equipment specifications, etc.

P. S.
IF YOU DON'T USE WIRE MESH BELTS, you'll do well to find out how they can cut costs and boost output by combining product movement with processing in your plant. For information write direct or call in your Cambridge field engineer. Look under "Belting-Mechanical" in your classified telephone directory for the Cambridge man nearest you.



Typical Cambridge Belt Weaves, Balanced and Rod-Reinforced, are widely used for many processes which can be combined with movement. Other Weaves available.

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OFFICES IN PRINCIPAL INDUSTRIAL CITIES



## Garrett Oil Tools' New Houston Plant Addition

The recently completed plant addition to the manufacturing facilities of Garrett Oil Tools, Inc., Houston, Texas, provides ample proof that a small plant can be as attractive and outstanding a structure as any major industrial installation.

Designed and constructed by Walter Kidde Constructors, Inc., of New York and Houston, the addition is a single story, 82′ x 112′ structure providing 9000 sq ft of floor space. From the outside, it looks almost like an attractive, bungalow-type, private residence; inside, the structure incorporates all the features normally associated with a larger industrial plant, i.e., bus-duct electrical system, etc.

Of fireproof construction, the building has a rigid frame, precast concrete joists and roof deck slabs, with a concrete block and brick exterior. A blank wall space has been left for a 30′ x 140′ extension planned for the near future. The temporary wall has been used as a decorative feature of the structure by special landscaping and an attractive sign, thus making the original structure look as though it is a completed building during the interim period.

## Chemical Industries Show

Purpose of the 24TH EXPOSITION OF CHEMICAL INDUSTRIES to be held at the Commercial Museum and Convention Hall in Philadelphia the week of Nov. 30 to Dec. 5, is to acquaint the chemical and allied industries with the latest developments in large scale production methods. Over forty per cent more space has been provided than at the show when it was held in New York two years ago.

Some of the products that will be shown by exhibitors entering for the first time include such equipment as homogenizers introducing the application of vibrations in the supersonic range, natural frequency conveyors, high frequency induction equipment adapted to use of determinators for carbon and sulfur, magnetic separators and spectographic equipment.

The exposition is directed by the International Exposition Company, 480 Lexington Ave., New York 17, N. Y. Charles F. Roth is manager, and E. K. Stevens associate manager.

## Columbia-Southern to Produce Ammonia, W. Va.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION will enter the ammonia production field.

E. T. Asplundh, president, said that the firm plans to construct its first ammonia producing facility soon at NATRIUM, W. VA. Contracts for the construction work will be let in the near future and the firm expects to be in production by late 1954.

## Kaiser Aluminum—Birmingham

HANNA STEEL CORPORATION, BIRMINGHAM, ALABAMA, has been appointed a distributor by KAISER ALUMINUM & CHEMICAL SALES, INC. The company will handle aluminum specification sheet, coil, plate and utility sheet, as well as rod, bar and wire products in the growing Birmingham industrial area.

## Deluxe Saw & Tool Company Moves to High Point, N. C.

THE DELUXE SAW AND TOOL COMPANY, a subsidiary of ROCKWELL MANUFACTURING COMPANY of Pittsburgh, Pa., is transferring its national headquarters and out-of-state manufacturing facilities from Chicago, Ill., and Columbus, Ohio, to its HIGH POINT, N. C., plant.

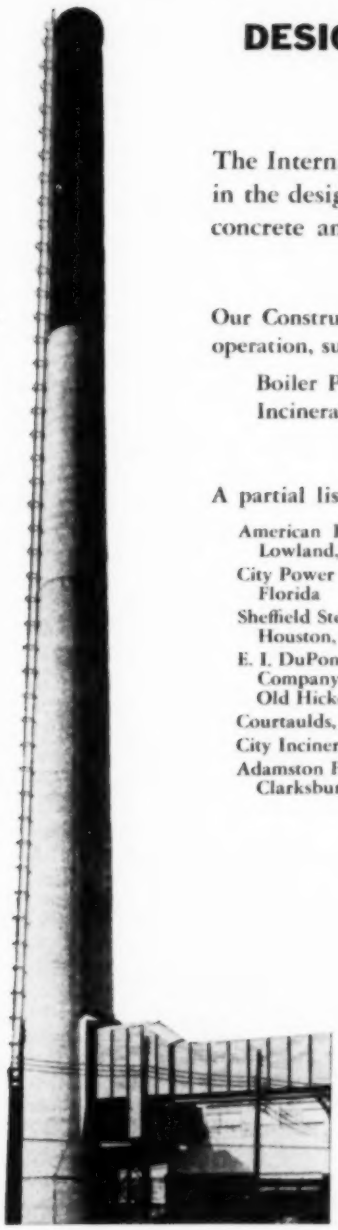
ALFRED G. FELDMANN, Deluxe general manager, who previously made his headquarters at Columbus, has already moved to High Point, and new machinery, equipment and personnel are being added to the plant.

## Westinghouse Buys Md. Plant

WESTINGHOUSE ELECTRIC CORPORATION has purchased the large government-owned plant in LANSDOWNE, MD., which the company has operated under lease since its construction in 1942.

The plant, located in Baltimore County adjacent to U. S. Route 1, is a large scale producer of electronic equipment for the armed services and for industrial and commercial customers. The plant is now producing induction heating equipment, microwave equipment, railroad radios, power line carrier equipment, radio transmitters, and certain radar components.

# CHIMNEYS



250-foot x 8-foot chimney built in 1950 for the Ferro Corp. of Nashville, Tennessee.

## DESIGNED, ENGINEERED AND CONSTRUCTED FOR INDUSTRIAL PLANTS

The International Chimney Corporation offers to industry over 25 years experience in the design, construction and maintenance of perforated radial brick, reinforced concrete and self supported steel chimneys on a national basis.

### CONSTRUCTION DIVISION

Our Construction Division has designed chimneys for all types of service and operation, such as listed below:

Boiler Plant Operation
Incinerator Waste Disposal
High Temperature Furnace Gas Diffusion
Low Temperature Acid Fume Dispersion
Alkaline Process Waste Gas Dissipation

A partial list of recent installations follows:

American Euka Corporation, Lowland, Tennessee
City Power Plant, Jacksonville, Florida
Sheffield Steel Company, Houston, Texas
E. I. DuPont de Nemours and Company, Incorporated, Old Hickory, Tennessee
Courtaulds, Ltd., Lemoyne, Alabama
City Incinerator, Fort Worth, Texas
Adamston Flat Glass Company, Clarksburg, West Virginia
Bethlehem Steel Corporation, Sparrows Point, Maryland
Stauffer Chemical Company, Salco, Alabama
Fred Weissman Company, Harrodsburg, Kentucky
City Incinerator, Norfolk, Virginia
Mead Corporation, Kingsport, Tennessee
Central Prison, Raleigh, North Carolina
General Motors Corporation, Arlington, Texas

### MAINTENANCE DIVISION

Our Maintenance Division performs service to industry in repairs to chimneys such as:

- Repointing and weatherproofing mortar joints
- Rebonding vertical and horizontal stress cracks
- Replacement of lightning rod protective systems
- Installation of outside steel reinforcing bands
- Replacement of reinforced concrete and cast iron head caps
- Cutting new and enlarging present flue openings
- Extension of chimney height, including removal and rebuilding of upper brickwork sections
- Removal and replacement of protective brick linings
- Resurfacing and waterproofing exterior concrete chimney columns

Repointing and banding chimney in operation.

## INTERNATIONAL CHIMNEY CORPORATION

**410 Wickwire Building, Buffalo, New York**

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Houston, Texas

Frederick Bldg.
Cleveland, Ohio

2801 Terramar St.
Ft. Lauderdale, Fla.

Roselawn Center Bldg.
Cincinnati, Ohio

408 N. Midler St.
Syracuse, N. Y.

Commercial Trust Bldg.
Philadelphia, Pa.

## VEPCO Elects Kidd V. P.

GEORGE E. KIDD has been elected vice president of the VIRGINIA ELECTRIC AND POWER COMPANY.

Formerly manager of the Richmond district of Vepco, Mr. Kidd succeeds T. NORMAN JONES, JR., who retired after more than 47 years of service. Mr. Kidd will have supervision of all personnel matters for Vepco's five thousand employees.

A South Carolinian by birth, he attended North Carolina State College where he received a bachelor of science degree in electrical engineering in 1913. Following two years with the General Electric Company, he entered the public utility field with a predecessor company of Vepco in Newport News as an electrician. In 1918 he was appointed assistant superintendent of power, a position which he held until being named assistant division manager there in 1930. Between 1940 and 1946 he was successively district manager of the company at Charlottesville, Newport News, Alexandria, and Richmond.

## Koehring Southern at Chattanooga, Tenn.

Recognizing the rapidly-developing potential of the South as a base of industrial operations, KOEHRING COMPANY of Milwaukee established an important subsidiary plant at Chattanooga in the spring of 1952. Today, that subsidiary, KOEHRING SOUTHERN COMPANY, is producing the Koehring 205 excavator in quantity to meet construction demands throughout the South.

The 205 is fully convertible for use as a shovel, hoe, crane, dragline, clamshell or magnet unit. It has a dipper capacity of ½ cubic yard for shovel or hoe work and can lift 10 tons when equipped as a crane.

Opening of the new plant at Chattanooga gave the firm a chance to double its excavator production, President J. R. Steelman of Koehring stated at an open house marking commencement of production at the Southern branch.

The first 205 shovel was driven off the assembly line on April 16 of this year and production is now flowing smoothly on a scheduled basis. Some 200 persons, mostly Chattanoogans, are employed at the plant and when maximum production is reached, from 300 to 500 will be employed.

Output of the Southern branch is going to Koehring dealers all over the country since production of the Model 205 excavator is now limited to the Chattanooga works. It is expected that erection and assembly of another Koehring excavator, now in the pilot model stage, will commence there in the near future.

Plant manager of Koehring Southern Company is N. J. Decker, formerly with the parent firm and previous to that with the Parsons Co. of Newton, Iowa, another Koehring subsidiary.

## Chain Belt—Shafer Bearing

CHAIN BELT COMPANY of Milwaukee announces the purchase of SHAFER BEARING CORPORATION, Downers Grove, Illinois, for the purpose of broadening the markets for its power transmission products. The new addition will operate as the Shafer Bearing Division of Chain Belt Company.

No change is made in the management responsibility. R. P. TENNES, former President, becomes Division Manager; M. J. TENNES, JR., Factory Manager; H. E. TENNES, Sales Manager; A. H. WILLIAMS, Chief Engineer; H. R. LUCAS, Controller; GORDON TERRIS, Director of Distributor Sales.

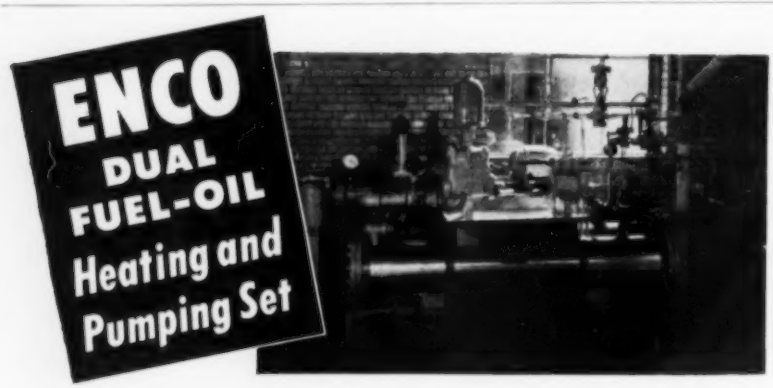
## Florida Metals Expands

FLORIDA METALS, INC., TAMPA, FLORIDA, is stocking two more of its warehouses with tube fittings and tube tools made by the PARKER APPLIANCE COMPANY, Cleveland, Ohio, manufacturer of industrial and aircraft hydraulic equipment.

In January, when appointed a distributor by Parker, Florida Metals stocked only its Jacksonville warehouse at 2937 Strickland St.

According to R. P. CHARLES, head of Florida Metals, the market has developed so rapidly that they must stock warehouses in Miami and Tampa as well. The Miami warehouse is located at 4100 N. W. 37th St.; the Tampa warehouse at 222 N. 12th St.

L. C. ELY, Parker sales-engineer, will be available to all three Florida Metals branches for customer engineering counsel.


**Two heaters and two pumps—one steam, one electric driven—in one set with these six features:**

1. Completely automatic operation with temperature and pressure regulation.
2. All essential equipment—including safety valves as needed—in one compact unit.
3. Individually designed to meet the specific needs of the power plant.
4. All parts visible and accessible for easy operation, maintenance and repair.
5. Pumps run at moderate speed. Heaters designed to give the correct viscosity and velocity without fouling.
6. Cleaner boiler room . . . all overflows connected to a common outlet, flanged drip pan for pumps catches oil drip.

EC490

**THE ENGINEER COMPANY**
75 WEST STREET, NEW YORK 6, N. Y.
IN CANADA: ROCK UTILITIES LTD., 80 JEAN TALON ST. W., MONTREAL, P. Q.

### ASCE Elects Southerners

THE AMERICAN SOCIETY OF CIVIL ENGINEERS has announced the election of DANIEL V. TERRELL, Dean of the College of Engineering, University of Kentucky, LEXINGTON, KENTUCKY, as president to succeed Walter L. Huber of San Francisco.

MASON G. LOCKWOOD of Lockwood & Andrews, HOUSTON, TEXAS, is one of the newly elected vice-presidents.

### C. B. Hunt Southern Repr.

C. B. HUNT & SON, INC., Salem, Ohio, manufacturer of "Quick-As-Wink" air and hydraulic control valves, has announced the appointment of ALFRED HALLIDAY as sales representative for KENTUCKY, Central and Western TENNESSEE, Northern MISSISSIPPI, and ARKANSAS.

Mr. Halliday maintains offices at 317 Starks Bldg., Louisville, Ky.; 1509 Madison Ave., Memphis, Tenn.; and 916½ Henley Ave., Knoxville, Tenn.

### J. J. Finnigan Company Opens New York Office

William J. McAlpin, President of the J. J. FINNIGAN COMPANY, ATLANTA, GEORGIA announces the opening of a branch office in New York City at 41 E. 42nd Street. The New York Office will service New York State, Connecticut and New Jersey.

Wendel W. Clinedinst and Myles Williamson of New York branch, J. J. Finnigan Co.

WENDEL W. CLINEDINST, has been appointed District Engineer of the branch and MYLES WILLIAMSON is Assistant District Engineer.

Mr. Clinedinst is a native of New York City, receiving his Mechanical Engineer's Degree from Stevens Institute of Technology. He brings to J. J. Finnigan a thorough background of experience in metal fabrication.

Mr. Williamson is also a native of New York City, and graduate of Stevens. He has been associated with the Power and Chemical fields for the past seven years.

### Abbot Opens New S. C. Mill

The new two million dollar worsted yarn mill for the ABBOT WORSTED COMPANY of Graniteville, Mass. has been completed.

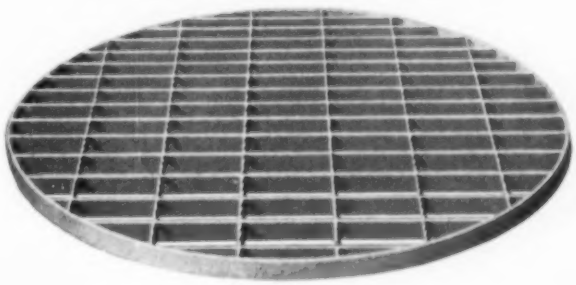
Daniel Construction Company of Greenville, S. C. and Birmingham, Ala., were general contractors for the project. The 92,000 sq ft, one-story building is totally enclosed and air-conditioned, finished in glazed tile throughout. Fiberglas insulation is laid over a precast concrete roof placed on span joist steel frame.

### Worthington—Tulsa

L. J. MACKENNA has been appointed District Office Manager of WORTHINGTON CORPORATION'S TULSA OFFICE.

Mr. MacKenna has been associated with the company for the past twenty years. His first assignment was at the company's former Blake and Knowles Plant as an engineer. In 1927 he moved to the Harrison office as an application engineer, and in 1930 to Detroit as sales engineer. Later he moved to the New York Office as general line salesman.


# REMOVE THE DANGER OF OPEN AREAS



## Here's the solution!

Blaw-Knox Electroforged Steel Grating is the ideal "coverage" for unprotected pits, light wells, basement stairways and other hazardous open areas. It is a one-piece steel "material" that provides safe footing under any conditions, and admits the maximum of light and air. *Strong . . . Silent . . . Secure.* Thousands of installations are still on the job after 20 years of traffic!

**Send us dimensional sketch**

We will then forward you price on grating cut to exact size. No nuts, no bolts, no special tools required. Don't delay . . . write today and make those danger spots both safe and usable!

**BLAW-KNOX COMPANY**
*Grating Department*
**BLAW-KNOX EQUIPMENT DIVISION**
**2034 Farmers Bank Building, Pittsburgh 22, Pa.**
**STerling 1-2700**

ELECTROFORGED® STEEL

**BLAW-KNOX GRATING**

### Plant Maintenance & Engineering Show—Chicago

THE PLANT MAINTENANCE SHOW, held for the past four years in the East, will move to Chicago for the 1954 exposition, and the name will be changed to the PLANT MAINTENANCE & ENGINEERING SHOW. The exposition will take place at the International Amphitheatre, Jan. 25-28, inclusive.

The Chicago exposition will cover more than 100,000 sq ft of exhibit space. Three hundred and ten companies already have been assigned space. General Electric, Clark Equipment, and Westinghouse plan displays covering more than 3,000 sq ft.

Concurrently with the show, the Plant Maintenance & Engineering Conference will be held at the Hotel Conrad Hilton.

Advance registration cards may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

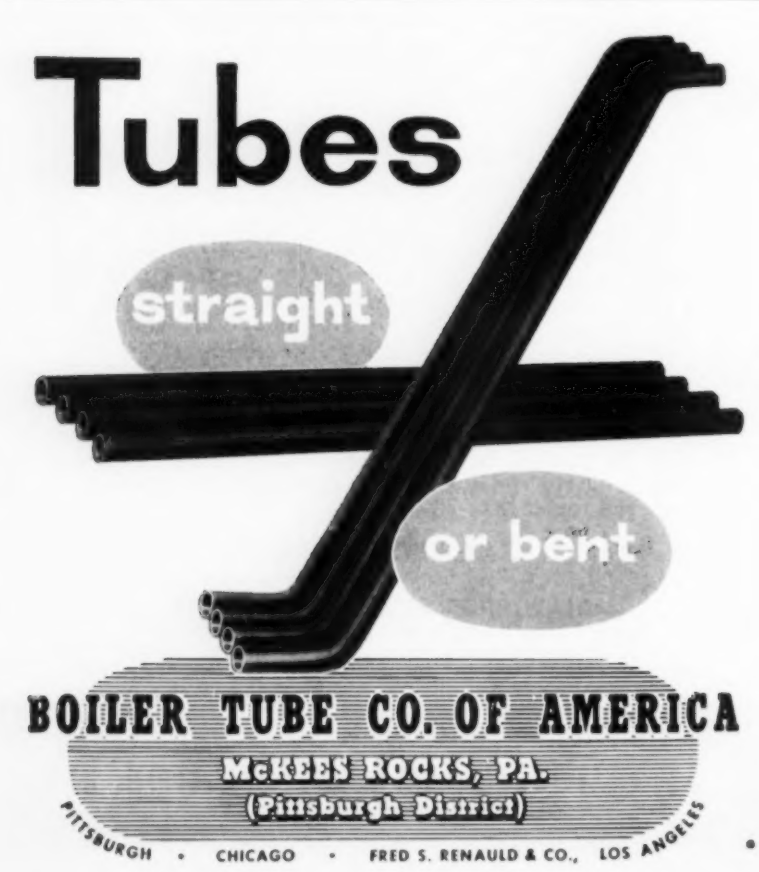
### Wheeling Corrugating Co. Names Schott—Louisville

WHEELING CORRUGATING COMPANY, WHEELING, W. VIRGINIA, has announced the appointment of J. P. SCHOTT to the position of manager of the firm's LOUISVILLE Branch, succeeding E. G. HILLMAN who retired August 1, 1953.

Mr. Schott, who started with the company in 1935, was a sales representative for many years and since 1946 has served as assistant to the manager at Louisville.

### Utica Drop Forge—Tex., La.

UTICA DROP FORGE & TOOL CORP. of UTICA, N. Y., announces the appointment of RONALD A. LARSEN as Manufacturers Representative for the complete line of Utica pliers, adjustable wrenches and screwdrivers in SOUTHERN TEXAS and LOUISIANA, with headquarters in Houston, Texas.




### Koppers Promotes Wheeley

Promotion of B. OTTO WHEELEY to the position of Southern District Sales Manager for the Tar Products Division of KOPPERS COMPANY, INC., was announced recently.

Mr. Wheeley, who has been Assistant District Manager, with headquarters in Birmingham, Ala., succeeds F. G. Owen, who died June 21. A native of Lafayette, Tenn., Mr. Wheeley was graduated from the University of Tennessee with a Bachelor of Science degree in Chemical Engineering and joined Koppers in 1943.

In his new position, he will have charge of sales of all the Division's products in 10 Southern states. Major products of the Division are hot and cold applied protective coatings, roofing materials, road materials and coal-tar chemicals.

### Rockwell Mfg. Co.—Texas

ROCKWELL MANUFACTURING COMPANY, 400 North Lexington Ave., Pittsburgh 8, Pa., recently announced that FLOYD V. SNODGRASS, former general manager of the company's Nordstrom Valve Division plant in California, has been appointed to a special administrative post involving supervision of production and operations at both Oakland, Calif., and the new plant at SULPHUR SPRINGS, TEXAS, scheduled to open late this year.

Mr. Snodgrass joined the company as a machinist in 1935, and served as plant manager and assistant general manager of the Oakland plant before being named general manager in 1949.

### Pocahontas Fuel Co.—Va.

POCAHONTAS FUEL COMPANY INC., Pocahontas, Va., has announced the appointment of EARL G. ROBERTSON as vice president in charge of sales for the company. Mr. Robertson will make his headquarters in the principal sales office of the Pocahontas Fuel Company at 122 East 42nd Street, New York City.

HARRY S. BOWEN, formerly assistant manager of sales, has been appointed sales manager of the company's new Southern division, with headquarters in the Travelers Building, Richmond, Va. Mr. Bowen will direct activities of sales agents in BALTIMORE, RICHMOND, GREENSBORO and RALEIGH and will have a staff of service engineers for customer consultation throughout the area.

### Thor—Atlanta Branch

A new Thor sales and service factory branch office will be opened in ATLANTA, GEORGIA, on October 1, it has been announced by J. A. HILL, vice president and sales manager of THOR POWER TOOL COMPANY, Aurora, Illinois.

The Atlanta office, scheduled to occupy quarters in a building under construction at 1363 Spring Street, will serve distributors and tool users in Georgia, South Carolina and Florida.

### Trane Co.—Chattanooga

THE TRANE COMPANY, La Crosse, Wis., manufacturer of air conditioning, heating and ventilating equipment, has announced that the CHATTANOOGA, TENNESSEE, sales office has been moved to 308 South Kelley Street.

JACK F. SPEARS is the sales engineer in charge of the office.

### Anaconda—Dallas

ROBERT T. SHIELS, JR., has been named District Manager of the DALLAS, TEXAS, territory of ANACONDA WIRE & CABLE CO. of New York.

Mr. Shiels has a substantial background in the electrical field, including several years with General Electric in Schenectady, Dallas, and Fort Worth.

### American Wheelabrator—N. C.

AMERICAN WHEELABRATOR & EQUIPMENT CORP., Mishawaka, Indiana, manufacturers of blast cleaning machines and dust and fume control equipment, recently announced that GEORGE C. TOLTON, former Seattle District Manager, has been appointed District Manager of the GREENSBORO, NORTH CAROLINA branch.

### Combustion Engineering Has Sulzer Bros. License

COMBUSTION ENGINEERING, INC., has consummated a license and technical assistance agreement with SULZER BROS., LTD., of Winterthur, Switzerland, one of Europe's outstanding manufacturers of boilers and power plant equipment. Under this agreement, Combustion Engineering will manufacture and market "Sulzer Monotube Steam Generating Plants" which have long been built by Sulzer Bros. and of which a great many high pressure installations have been rendering satisfactory service in European countries for many years.

### A. O. Smith—Houston

Liquefied Gas Products Division of A. O. SMITH CORP. has announced that FRANK ROW, former LPG sales coordinator for the company operating at Houston Works, has been named Southern Regional manager with headquarters at HOUSTON.

### Olin Controls Interstate

Olin Industries, Inc., has purchased control of INTERSTATE NATURAL GAS COMPANY of MONROE, LOUISIANA, from Standard Oil Company of New Jersey, John M. Olin, President, announced recently.

Mr. Olin said that Interstate was acquired to provide his company with a facility to aggressively explore and develop the mineral rights of its 455,000 acres of land in EAST TEXAS, ARKANSAS, and LOUISIANA, acquired from Frost Lumber Industries Incorporated, last year.

Interstate produces and transports natural gas from the Monroe gas fields to refineries in Baton Rouge.

### Barber-Colman—Florida

The Automatic Control and Uni-Flo Divisions of the BARBER-COLMAN COMPANY announce the opening of a new factory branch office in JACKSONVILLE, FLORIDA. D. W. MINICK will manage the Jacksonville Office located at 1143 Mary Street.

### Fire Protection Service

U. S. FIRE PROTECTION ENGINEERING SERVICE, INC., has been established at 805 Baltimore Ave., KANSAS CITY, Mo., with facilities to handle work in industrial plants throughout the country. FRANK H. GAGE is president of the new organization.

The engineering staff consists of highly trained and experienced fire protection engineers familiar with equipment and methods for prevention, control, and extinguishment. It is also well informed on the requirements of insurance underwriters and fire safety codes of industry and government.

### Goodyear Warehouse—Ala.

GOODYEAR TIRE & RUBBER CO., INC., Akron, Ohio, recently completed construction of the South's largest industrial warehouse, at GADSDEN, ALABAMA.

The 1,000 ft by 400 ft building is located on a 24 acre site, with facili-


MARTINDALE

MODEL 52 V.A.O. TESTER

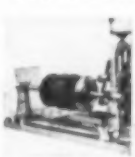
This new, sturdy, portable instrument has 5" meter—Four testing ranges: Volts, AC and DC: 0-2.5, 0-10.0-50, 0-250, 0-1000, Amperes DC only: 0-10, Ohms: 0-1000, 0-10000; Megohms: 0-1, 0-100. Selector Switch provides four positions: Volts AC, Volts DC, Ohms, Amps. Range Switch has 5 positions which provide for above Voltage ranges, 4 ohm ranges, and 1 ampere range. 4' test lead has both prods and alligator clips. Has sturdy, leather carrying case.

GROWLERS

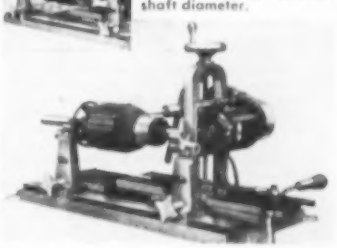
PORTABLE GROWLER TYPE U-2

This Universal Adjustable Growler may be used as both an external Growler for armatures and an internal Growler for stators. It will test armatures from 2" diameter up, and stators from 5⅛" diameter up. Available with or without meter. Six other models.

BENCH-TYPE UNDERCUTTER



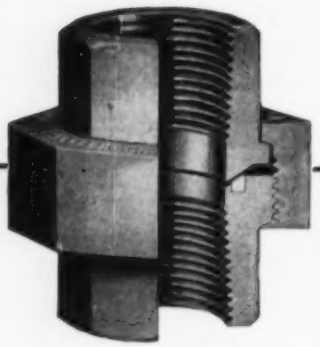
**AT LEFT**—Undercutting Vertical Commutator.
**BELOW**—Undercutting Horizontal Commutator. Note V-support at right raised to compensate for smaller shaft diameter.



Model HV-3 is a precision built, rugged, fast and accurate undercutter with a wider range of armature sizes and shaft lengths than any similar machine being built.

*Write for New 64-page Catalog No. 29 describing these and many other products for Industrial Maintenance, Safety and Production.*

MARTINDALE ELECTRIC CO.
1334 Nird Ave. Cleveland 7, Ohio



**Ask Yourself these questions**

**before you buy pipe unions again**

1. Are the unions you're using designed having a truly spherical ball joint with brass seats recessed for protection and free-flow?
2. Do they have octagonal ends for easy tightening by any type wrench?
3. Are they *plainly marked* for 300# pressure?
4. Are they made of Air Furnace Malleable Iron with a tensile strength of 55,000 p.s.i. and air tested before shipment?

**If you can't answer "Yes" to *all* these questions, you're not using**

**jefferson UNIONS**

. . . and you're not taking advantage of all these features which are back of Jefferson's reputation for high quality, maximum service and economy at a slightly higher cost.

The Jefferson line includes: WOG 2000# to 2" and 1000# to 4" in Jefferson 300# brand straight through unions, union ells and union tees; flange unions; AAR male and female unions; Enduro 300#, Excel 250# and Master 150# unions. All types also available with all-iron seats. Underwriters approved.

*Contact your nearest distributor or us direct for your requirements.*

•

**JEFFERSON UNION CO.,**

650 W. 26th St., New York 1, N. Y.
79 Gooding St., Lockport, N. Y.
45 Fletcher Ave., Lexington 73, Mass.


## news for the South and Southwest *(continued)*

### 24th Chemical Exposition

THE 24TH EXPOSITION OF CHEMICAL INDUSTRIES scheduled from Nov. 30 to Dec. 5, 1953, will be held in Philadelphia this year for the first time. It is expected to be the biggest show of its kind ever held, with nearly five hundred exhibitors, and more than four acres of exhibits of chemical materials and chemical processing equipment.

The Exposition, to be at the Commercial Museum, is under management of the International Exposition Company, with Charles F. Roth manager and E. K. Stevens associate manager. Admission will be by invitation and registration only, the general public excluded.

### Texas Gas Transmission Completes Pipeline—Ky.

TEXAS GAS TRANSMISSION CORPORATION, OWENSBORO, KENTUCKY, has put into service the final 45-mile segment of its 1952-1953 construction program.

The system can now deliver more than 1 billion cubic feet of gas a day through 3,236 miles of pipeline to serve utility and industrial customers in KENTUCKY, TENNESSEE, MISSISSIPPI, ARKANSAS and LOUISIANA.

•

### Kaiser Aluminum Plant—La.

The largest aluminum reduction plant in the United States was recently completed by KAISER ALUMINUM & CHEMICAL CORPORATION at CHALMETTE, LOUISIANA, near New Orleans.

Full production is under way, and annual capacity is rated at 400 million pounds. The eight potlines are housed in sixteen 960 ft buildings. Each line consists of 144 electrolytic pots in which the alumina produced at Kaiser's Baton Rouge plant is reduced to molten aluminum.

Plant facilities include a water system and a 475,000 kw power plant. J. H. LINDEMUTH is Works Manager.

### Westinghouse—Staunton, Va.

THE WESTINGHOUSE ELECTRIC CORPORATION plans to build a multi-million dollar ultra-modern packaged air conditioning plant near STAUNTON, VA.

The new plant is an important part of the current $296,000,000 Westinghouse expansion program, which will increase production by 50 per cent.

The plant will be operated by the Westinghouse Air Conditioning Division, Hyde Park, Mass.

Packaged air conditioning units from 2 to 15 ton capacities will be manufactured at Staunton. The new all-electric heat pump, which uses only air to provide year round cooling and heating, will also be made. Higher capacity air conditioning equipment and accessories up to 100 tons will continue, as at present, to be manufactured at other locations.

### Parker Distributor—Alabama

MILL & TEXTILE SUPPLY, INC., 3130 Third Avenue South, BIRMINGHAM, ALA., has been appointed distributor for PARKER APPLIANCE CO. of Cleveland, Ohio.

The new distributor will handle industrial tube fittings, tube fabricating tools, dual heat transfer coils, pressure gauge snubbers, draft gauge manifolds, and lubricants.

L. C. ELY is Parker's field representative in the area, and L. S. SELMAN, JR., is president of the Birmingham company.

### Edward Valves—Southwest

EDWARD VALVES, INC., East Chicago, Indiana, has announced the appointment of H. W. BIERMAN as sales engineer for the territory comprising the State of OKLAHOMA and parts of MISSOURI, KANSAS, ARKANSAS and TEXAS.

Bierman will make his headquarters at the Rockwell Manufacturing Co. offices in Tulsa, Oklahoma. Edward Valves, Inc. markets a complete line of cast and forged steel valves for petroleum, power plant, and other industrial services.

### Nordberg—St. Louis

NORDBERG MANUFACTURING COMPANY, Milwaukee, Wis., recently established a district office at 3300 South Second St., ST. LOUIS, MO., in the company's Busch-Sulzer (Diesel Engine) Division plant.

The new office, headed by HAROLD M. PROPP, will serve crusher, screen, and process machinery customers in the South Central and Southwestern States.

# Equipment . . Supplies . . Methods

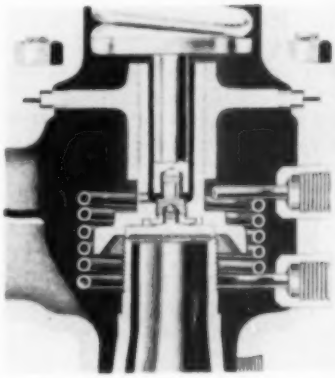
(Starts on page 8)

### Internal Heat Exchanger for Safety Relief Valves

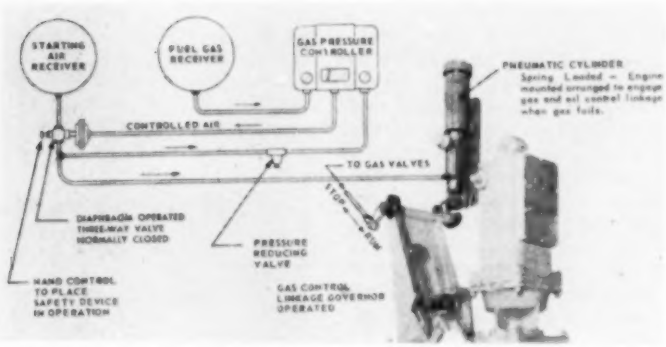
K-5 FARRIS ENGINEERING CORPORATION, 630 Commercial Ave., Palisades Park, N. J., features an internal heat exchanger on all Farris nozzle and semi-nozzle safety relief valves.

The unit can be incorporated in the valve body without creating interference with the rest of the valve mechanism. It eliminates the necessity of steam tracing or steam jacketing a valve where highly viscous lading is encountered. The Farris heat exchanger keeps the lading material in a fluid state with exceptionally low steam consumption. It provides maximum efficiency by placing the heat where it is most effective.

**For more data circle item code number on the postage free post card—p. 17**



Farris Engineering's internal heat exchanger consists of a steel coil inserted into the valve body and led out to connect with a steam line. Coil ends are accessible for return-pipe installation or one-pipe installation with a vent valve. Steam trap drains the coils and construction is suitable for back pressure.




Worthington's "Automatic Fuel Switcher" consists of an engine mounted, spring loaded, pneumatic cylinder arranged to engage gas and oil control linkage when gas fails; pressure controller mounted external to the engine (maintains maximum air pressure on system and keeps it in balance until gas falls below a predetermined minimum value—usually 25 psi); gas pressure pick-up (communicates gas supply pressure to controller); three-way valve, single diaphragm operated; and reduction valves to step starting air pressure down from as high as 250 psi or as low as 100 psi to 17 psi for operation of pressure controller.

### Automatic Fuel Switcher

K-6 WORTHINGTON CORPORATION, Harrison, N. J., has introduced the Automatic Fuel Switcher for use with the company's dual fuel diesel engines to prevent shutdowns when gas pressure drops below normal or fails, by automatically changing over to 100% fuel oil instantly.

Whether operating on gas with pilot oil or 100% oil, the device places the engine under command with full travel at its best governing efficiency. Using full travel from no load to overloads steadies governor control of the fuel metering equipment during all load changes. Previously only one-half governor travel was available for either gas or oil to provide the automatic change-over.

ALLIGATOR
V-BELT DRIVES
. . . you can make up all lengths of V-Belts quickly

★ **Units contain V-Belting, Fasteners and Tools** — everything you need in one package for all emergencies when correct endless V-belt is not available.

★ **Avoid costly delays,** shut-downs and pickups.

★ **Eliminates costly dismantling** of machinery when re-belting.

★ **Completely modern make-up units** that give you peace of mind as well as stock on hand.

★ **Less Stretch and Follow-Up Maintenance.** Just One Strong Joint.

★ **Alligator V-Belt Drive Units,** available in sizes A, B, C and D. B size furnished in display box.

★ **Order from your distributor. Ask for Bulletin V-215.**

**FLEXIBLE STEEL LACING CO.**

4625 Lexington St., Chicago 44, Ill.

### Measuring Conductivity by Hand Detector Pickup

K-7 MAGNAFLUX CORPORATION, 7300 W. Lawrence Ave., Chicago 31, Ill., announces the Magnatest FM-100 Conductivity Meter which has, by permitting rapid measurement, made the physical property of conductivity a practical and useful industrial tool.

This instrument makes conductivity measurements quickly available for laboratory control or factory use. The need for wire-like samples or cross-sectioning of parts is eliminated. It gives absolute conductivity measurements of non-ferrous conducting materials directly from a large dial on the front of the unit. An operator merely places the simple hand probe on a part and reads the dial. All that is required is a relatively flat area about ⅜ in. in diameter on which to place the probe.

For many applications the absolute conductivity reading is all that is needed. In some cases, these readings can be used to sort mixed lots of metals and alloys. The other general category of applications depends upon the relationship between conductivity and other physical properties. The conductivity of aged aluminum alloys, for example, varies with temper. Therefore, once standard comparisons are made in the laboratory, the destructive indent hardness test can, in many cases, be replaced by the non-destructive Magnatest instrument.

The Magnatest FM-100 Conductivity Meter evaluates material, alloy and hardness; sorts mixed non-magnetic metals; and gives immediate reading of conductivity in absolute units with no variables due to contact.

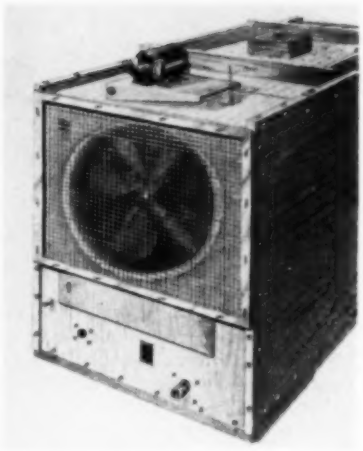
### All-Redwood Cooling Tower

K-8 THE MARLEY COMPANY, 222 West Gregory Blvd., Kansas City 13, Mo., announces an all-redwood cooling tower, designed especially for localities with high corrosion incidence.

The Marley Redwood Aquatower is being produced in three models, capable of serving air conditioning and refrigeration in the 5- to 10-ton range.

Outstanding features include forced draft air flow—vertical air discharge; all redwood, all bolted casing and basin construction; simplicity of design to provide easy access to mechanical equipment and tower; open water distribution system to facilitate inspection and cleaning; mechanical equipment designed for cooling tower service exclusively; and redwood resin stain finish for attractive appearance.

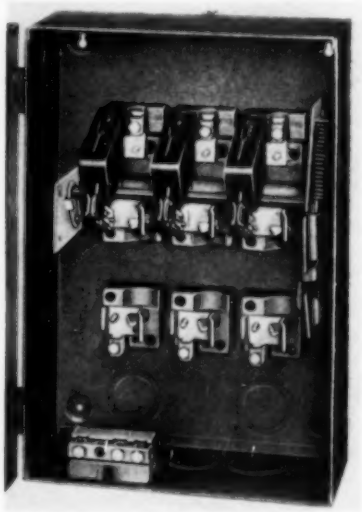
The tower is shipped completely assembled. It may be put into service by merely making electrical and water connections.



Marley Company's new tower is the first small cooling tower to employ forced draft design with vertical air discharge, air being blown through the tower and discharged vertically at the end of cooling chamber.

### Industrial Safety Switch

K-9 FEDERAL ELECTRIC PRODUCTS COMPANY, 50 Paris St., Newark, N. J., is offering a new industrial safety switch featuring front operation—permitting space-saving installation by recessing or close-ganging batteries of switches—and an oversize handle that shows up distinctly from a distance, indicating positively whether the switch is "on" or "off."



Front operating safety switches of Federal Electric are available in 30, 60, 100 and 200 amp sizes for use in 250 and 600 volt lines. Pressure spring of fuse-holder is located under the fuse where it is unaffected by fuse heat.

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Oil, Gas & Gas-Oil Combination Burners

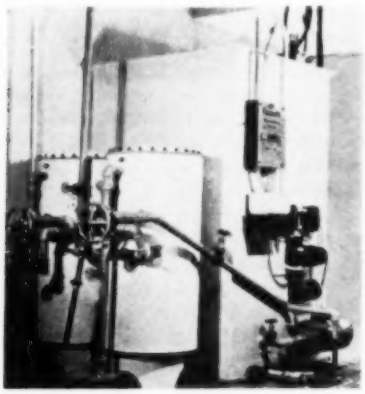
### V-Belting Fastener Units

K-10 FLEXIBLE STEEL LACING Co., 4607 Lexington St., Chicago 44, Ill., is offering new Alligator V-Belt Drive Units which include everything needed to make up V-belts of any length.

Introductory units contain open-end V-belting, fasteners, and tools. Replacement units contain belting and fasteners. Units are furnished for A, B, C and D drives. This equipment is said to be useful for emergencies and when correct endless belt is not available.

### Package Water Conditioner

K-11 THE PERMUTIT COMPANY, 330 West 42nd St., New York 36, N. Y., has introduced a completely integrated package water conditioning plant.



Permutit's package water conditioning plant is available in eight standard sizes ranging from 500 to 3,300 gph and flows of 12,000 to 79,200 gallons per 24 hours.

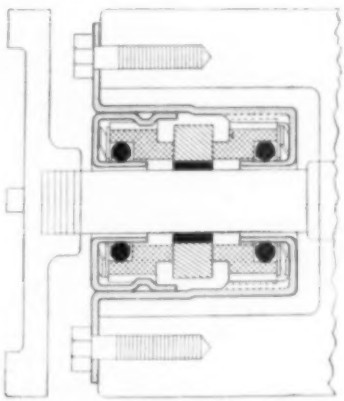
The unit, without any alterations, may be used to remove turbidity, color and organic matter from water supplies; to chlorinate; to remove bad tastes and odors; to remove iron and manganese; to neutralize; to soften; and to de-alkalize.

The package plants have many applications among which are to condition water for small municipalities; lumber and logging camps, factories, power stations, railroads, boiler plants, mills, canneries, bottlers, breweries, laundries, and ice plants.

Each complete water conditioner consists of a Precipitator with a built-in clearwell, a proportioning chemical feeder control, a coagulant feeder tank, a lime or soda ash and hypochlorite feeder tank, an inlet float control valve, Neutralite filter unit(s), Carbo-Dur purifier unit(s) and a service pump.

### Double-Face Shaft Seal

K-12 CARTRISEAL CORPORATION, 3515 W. Touhy Ave., Lincolnwood 45, Ill., has announced a new double-face cartridge seal specially designed to meet the requirements of higher pressures, higher temperatures and higher rpm.



Cartriseal's double-faced cartridge seal is available with either pressed-in or flange mounting. Manufacturer claims that the "O" Ring "floats" the sealing faces, protecting them from the shock and vibration that ordinarily causes leakage.

The seal is one unit, with all parts contained in a compact housing cup. Installation is extremely simple, merely push the cartridge seal onto the shaft and tighten the mounting screws. The cartridge construction also protects the lapped sealing faces from damage during installation.

The stator rings are designed to insure close hydraulic balance even when pressure is applied from either side of the seal. Stators are not affected by thermal expansion of companion parts. Cavity between the two stators contains a lubricant that prevents seal from overheating if run dry.

### Shaft-Mounted Speed Reducer

K-13 AMERICAN PULLEY COMPANY, 4200 Wissahickon Avenue, Philadelphia 29, Pa., has introduced the new Shaft-King shaft-mounted speed reduction units which extend the advantages of V-belt drives to cover a wide variety of slow-speed equipment.

Adaptable to any shaft-size up to 3 15/16 in. Shaft-King speed reducers are exceedingly compact, requiring only standard shaft lengths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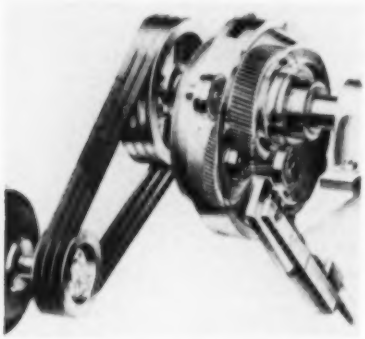

The new 13 to 1 ratio Shaft-King mounts directly on standard shaft extensions, requires no special foundations or supports. Shaft-King's three-wall, internally ribbed, cast-iron housing provides permanent gear and bearing alignment for greater efficiency and longer life.

(twice the shaft diameter plus clearance) to be mounted directly on the shaft of the driven machine.

Two trains of flame-hardened helical gears reduce the driven shaft speed to obtain a 13-to-1 ratio. Gearing and bearings are continuously splash lubricated by the high speed gear and the counter-shaft pinion which operate in an oil reservoir in the lower third of the exclusive three-wall housing.

Another exclusive construction feature is the patented concentric shaft design which places both the input and output shaft above the oil level. This eliminates the necessity for bearing seals to operate against a head of oil. Additional features include a leakproof, anti-friction oil sealing system, interchangeable split tapered bushings, and the use of both ball bearings and tapered roller bearings.

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## Rotary Feeder Air Lock For High Pressured Application

K-14 BEAUMONT-BIRCH CO., INC., 1501 Race St., Philadelphia 2, Pa., has announced a new rotary feeder air lock for handling bulk material under high pressure or vacuum.

Applicable to chemical and food processing, it is available in cast iron, stainless steel or monel.

Sealing ends of rotor is accomplished by means of a seal which may be spring loaded, of rawhide, neoprene, asbestos or teflon either run dry or lubricated. Further assurance against leakage is obtained by the injection of an inert gas under pressure between ends of rotor and casing. This is important when noxious or poisonous gases are involved in the process. Shaft is also sealed against leakage.

Rotor is available with six pockets or more and vanes are hard surfaced, ground and polished to close tolerance.

## Rust Preventive for Turbine Lubricating Oil Systems

K-15 GULF OIL CORPORATION, Gulf Bldg., Pittsburgh 30, Pa., has developed a new rust preventive, known as Gulf Oilcoat T.

A compounded oil with a non-metallic high potency additive to prevent corrosion of metal surfaces, the new product is designed particularly for use in steam and the gas turbine lubricating oil systems to prevent corrosion of metal surfaces during the interval of time between shipment of the turbine from the manufacturer's plant and erection of the unit in the field.

In addition to its rust protection properties, the most outstanding characteristic of Gulf Oilcoat T is its compatibility with turbine lubricating oils. The importance of this factor is particularly significant when the consumer flushes the lubricating oil system of the turbine with the same oil that is to be used for lubricating the turbine in service. A great many utilities and industrial users of turbines follow this practice, and the new product was developed specifically for this type of application.

It can be effectively applied to metal surfaces by spraying (fogging), dipping or brush application. Because of its light viscosity it can easily be sprayed or circulated in a lubricating system and then drained, after which the metal surfaces will be protected against rust.

## Safety Shut-Off Valve Checks Fuel-Fed Fires

K-16 VALCO, INC., 1410 West St., Cincinnati 15, Ohio, is marketing an automatic, temperature actuated safety shut-off valve for use in all flammable liquid and gas lines.

The valve is a quick closing type, normally held in the open position by an actuating head that operates like a standard sprinkler head. At the specified temperature, the head opens and releases the tension on a stainless steel spring which snaps the valve closed in a fraction of a second.

The valve is packless—it uses a bellows seal to prevent binding and leakage. The bellows is of all metal construction. This type of seal permits rapid inspection and the change of heads without leakage.

Valco's automatic safety shut-off valve, available in sizes from ½ to 2½ in., can be mounted in any position.

# WHAT'S NEW and Where to Get It

*Free literature on the latest developments in equipment and supplies is offered by leading manufacturers. For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.*

**W-1** **AIR OR GAS DRYERS**—Bulletin 16,081, 8 pages—Illustrates and describes Pritchard Hydryers which are packaged dryers for reduction of moisture contents of compressed air or other gases. Flow diagrams and sizing tables for correct selection are included.—J. F. PRITCHARD & CO., 210 W. 10th St., Kansas City, Mo.

**W-2** **AERIAL CABLES**—Bulletin K-1064, —8 pages—Describes the physical and electrical characteristics of self-supporting aerial cables with aluminum conductors. Complete dimensional information and current carrying capacity tables are included. Prepared especially for utilities, consulting and industrial engineers.—THE OKONITE COMPANY, Passaic, N. J.

**W-3** **PORTABLE FIRE EXTINGUISHERS**—Bulletin PSR5, 8 pages—Describes all types of portable fire extinguishers for Class A, B, and C fires. Outlines smoke and temperature rate of rise fire detection systems for machinery and entire rooms.—WALTER KIDDE & COMPANY, INC., Belleville 9, N. J.

**W-4** **EXPLOSION PROTECTION**—Fireye Bulletin CP21, 12 pages—Gives a complete, non-technical explanation of the explosion danger inherent in fuel burning equipment, and the protection now available. Shows how to determine whether a fuel burner is adequately protected against explosion, and describes protective equipment. —COMBUSTION CONTROL CORPORATION, Dept. NB-8, 718 Beacon St., Boston 15, Mass.

**W-5** **PIPING & PRESSURE VESSELS**—House Organ, Vol. 1, No. 1, 46 pages—Prepared to be of help to engineers and designers; presents up-to-date information on Codes and Standards dealing with piping and pressure vessels; basis used by the Codes for establishing allowable stresses; and related engineering data.—TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago 90, Ill.

**W-6** **SILICONE RUBBER PRODUCTS**—Bulletin AD-147, 8 pages—Describes silicone rubber products including diaphragms, gasketing, sheet packing, oil seals, rings, insulation tape, rod and valve stem packings, and molded shapes for many industrial uses. Gives typical applications.—THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

**W-7** **CORROSION PROTECTION**—Bulletin 129, 1 page—"Cheap Paint Isn't Cheap!" gives scientific data for buyer and maintenance engineer on basic economy in purchasing and using paint for protection against corrosion. Discusses the economics of protecting metal with paint.—CARBOLINE COMPANY, 331 Thornton Ave., St. Louis 19, Mo.

**W-8** **TRUCK OPERATION** — Booklet, "How to Operate a Lift Truck"—Cartoon presentation of information about the operation of a lift truck, preventive maintenance, safety and basic materials handling, is prepared for use in operator training program. Drawings for setting up an obstacle course are included.—HYSTER COMPANY, 2902 N. E. Clackamas St., Portland 8, Oregon.

**W-9** **PORTABLE SPACE HEATERS**—Booklet, 38 pages—"Guide to Selection and Use of Portable Space Heaters" describes advantages and disadvantages of all types of portable heating equipment and discusses all phases of portable space heating, including safety features and plant applications.—AMERICAN AIR FILTER CO., INC., 1824 Third Ave., Moline, Ill.

**W-10** **HANDLING TOOLS**—Catalog Section 823—Describes complete line of handling tools designed specifically for high-voltage switches, fuses, and cutouts. Includes tools for single handling functions and tools for multiple purposes. Gives dimensions and other information for ordering.—S&C ELECTRIC COMPANY, 4425 Ravenswood Ave., Chicago 40, Ill.

**W-11** **GRAPHIC PANELS**—Bulletin PI-153, 4 pages — "Panelgraphs Throughout Industry" shows typical applications of graphic control panels in power stations, petroleum refineries, chemical, and process industries. Techniques of graphic symbolism are illustrated, as well as graphic panel components.—PANELLIT, INC., 6312 North Broadway, Chicago 40, Ill.

**W-12** **DEAERATORS** — Bulletin 575, 8 pages—Presents a new approach to boiler feedwater deaeration by means of a new mechanical design incorporated in the Schaub Zero-Oxygen Deaerator. Construction, operation, and application are covered. Illustrated with equipment and plant photographs.—FRED H. SCHAUB ENGINEERING COMPANY, 2110 South Marshall Blvd., Chicago 23, Ill.

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**W-13** **DROP FORGED CHAIN**—Bulletin "Duraflex Forged Chain," 4 pages—Describes a new 2½ in. pitch drop forged conveyor chain with an ultimate strength of 27,500, using no riveted pins, and designed for assembly or disassembly without tools. Illustrated with line drawings and detailed diagram.—JERVIS B. WEBB COMPANY, 8951 Alpine Ave., Detroit 4, Mich.

**W-14** **STEAM GENERATORS** — Bulletin G. B.-153, 20 pages—Covers diversified line of Union steam generators and related equipment. Describes eight basic arrangements of two, three and four drum steam generators; heat recovery units; and process equipment. Illustrated with design drawings and photographs.—UNION IRON WORKS, Erie, Pa.

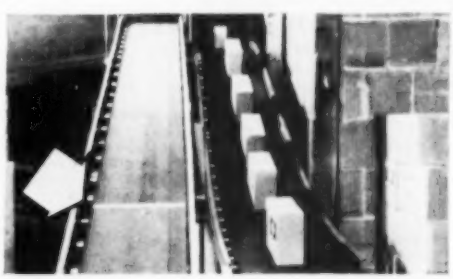
**W-15** **STEAM TRAP SERVICE**—Bulletin No. 239, 8 pages—Discusses steam trap installation, testing and preventive maintenance, inspection and repair, and trouble shooting. Tables give parts list, identification by dimension, interchangeability, and pressure change assembly interchangeability. — ARMSTRONG MACHINE WORKS, Three Rivers, Mich.

**W-16** **OIL BURNERS**—Brochure A-604, 8 pages—Describes various types of heavy fuel oil burners designed for fully automatic operation in a wide variety of applications. Table gives hourly capacity ratings. Construction features are covered in detail. Photographs show equipment and installations.—RAY OIL BURNER CO., 1301 San Jose Ave., San Francisco 12, Calif.

**W-17** **POWDER-ACTUATED FASTENING**—Form No. 82, 30 pages—"Modern Fastening Methods" describes Ramset powder-actuated fastening system for a variety of uses including steel to concrete, wood to concrete, steel to steel, fabricated hard materials to steel, and others. Illustrated with drawings, diagrams, and photographs. — RAMSET FASTENERS, INC., 12117 Berea Road, Cleveland 11, Ohio.


ALLIGATOR

CONVEYOR BELT LACING



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★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.

★ In canneries where corrosion or rust is a problem specify Alligator made of Stainless or Monel.

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★ Separable and smooth on both sides.

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JUST A HAMMER TO APPLY IT

# Books for the Plant Engineer

### Power System Analysis

By Frederick S. Rothe
Published by John Wiley & Sons, Inc.
440 Fourth Ave., New York 16, N. Y.
187 pages
Price, $5.00

"An Introduction to Power System Analysis" considers the characteristics of each of the building blocks of the modern power system—generator, transformer, transmission line, and load. It offers reliable information on such aspects of the field as synchronous machine theory; transformer theory; transmission line theory; symmetrical components, and stability. While the book covers problems associated with the fundamental operating frequency, transient behavior of the components of the system during disturbances is thoroughly investigated. The book includes many worked examples and problems at the end of each chapter.

### Refrigeration Manual

Published by the Trane Company
La Crosse, Wisconsin
125 pages
Price, $1.50

This completely revised edition of the Trane Refrigeration Manual gives practical, easy to understand information on installation, operation, and servicing of refrigeration equipment. It contains two entirely new chapters on refrigeration piping, with latest engineering data. Other changes include a new chapter on refrigeration system control.


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*Eats Up Everything!*

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. . . including Pine, Oak, Gum, Hickory, Elm, Wet Veneer, Round-up and Sandy Bark. Conveyor-fed — no attendant required. Positively protected from major damage by tramp steel. All connections locked — nothing to shake loose. Maintenance costs unbelievably low.

". . . Dear Mr. Montgomery: It is an unbelievable machine and it is still hard to believe that it is actually handling the enormous volume of scrap we are feeding into it. We operate the hog without an attendant —which means a considerable saving. —J. B. Black, Plant Superintendent, Ocala Manufacturing, Ice and Packing Co., Ocala, Fla." C.I.T. Terms Available

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*P. O. Box 3687, Jacksonville, Florida*

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***Multiple, Fyr-Mobile and Flo-Matic*** Stoker Systems burn wood chips, sawdust and/or cheapest sizes of coal. One user recently changed from oil to *FYR-FEEDER WOOD-BURNING*, using wood chips and sawdust hauled from a local sawmill. Total fuel cost is now less than $150 per month as against $950 for oil firing—a saving of $800 per month.

*FINES BURN IN SUSPENSION*

These stokers automatically meter, feed, burn by continuously distributing airborne fuel over grate (the fines burning instantly in suspension) such fuels as wood (planer) chips, sawdust, cheaper coal sizes, coke breeze, hogged wood and other solid fuels and makes very large savings.

*BIN-TO-BOILER CONVEYORS*

*FYR-FEEDER* Automatic "Bin-to-Boiler" Conveyor Systems move fuel *instantly* from bin or waste wood storage vault to *FYR-FEEDER* Multiple or *FLO-MATIC* or *FYR-MOBILE* Stokers to meet steam demand. More steam is assured.

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Regardless of type of combustion equipment you now use, learn about *FYR-FEEDERS*—how they pay for themselves out of fuel and labor savings and *WHY* they are replacing underfeeds and other stokers, chain grates and oil burners. *THOUSANDS* of *FYR-FEEDERS* in service. They *PAY* for themselves. Write for Engineer —No Obligation.

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1—100 H. P. 2—261 H. P., Erie City Economic. Like new. Used less than 2 years. Standard trim. Automatic stokers. I. D. fans, stack. ASME code construction. Immediate delivery. Write for stock list of boilers. Peerless Boiler & Engineering, 2015 E. Park Place, Oklahoma City, Okla.

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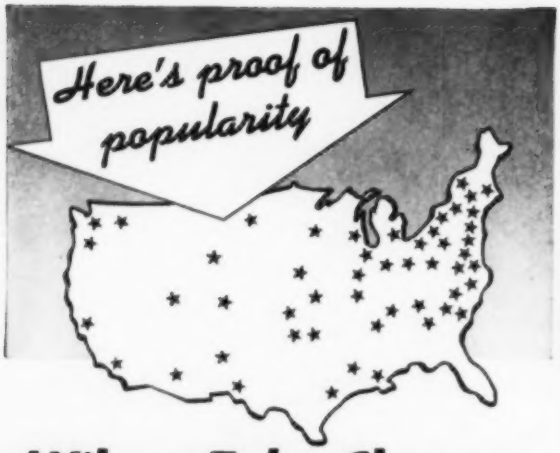


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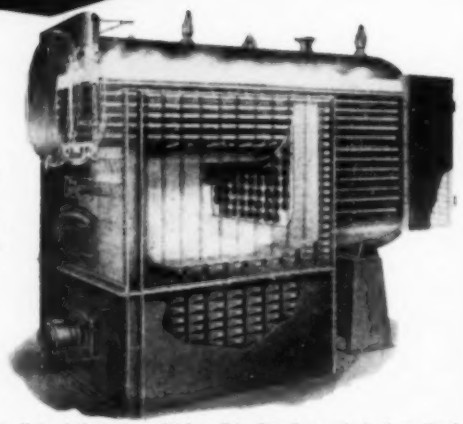

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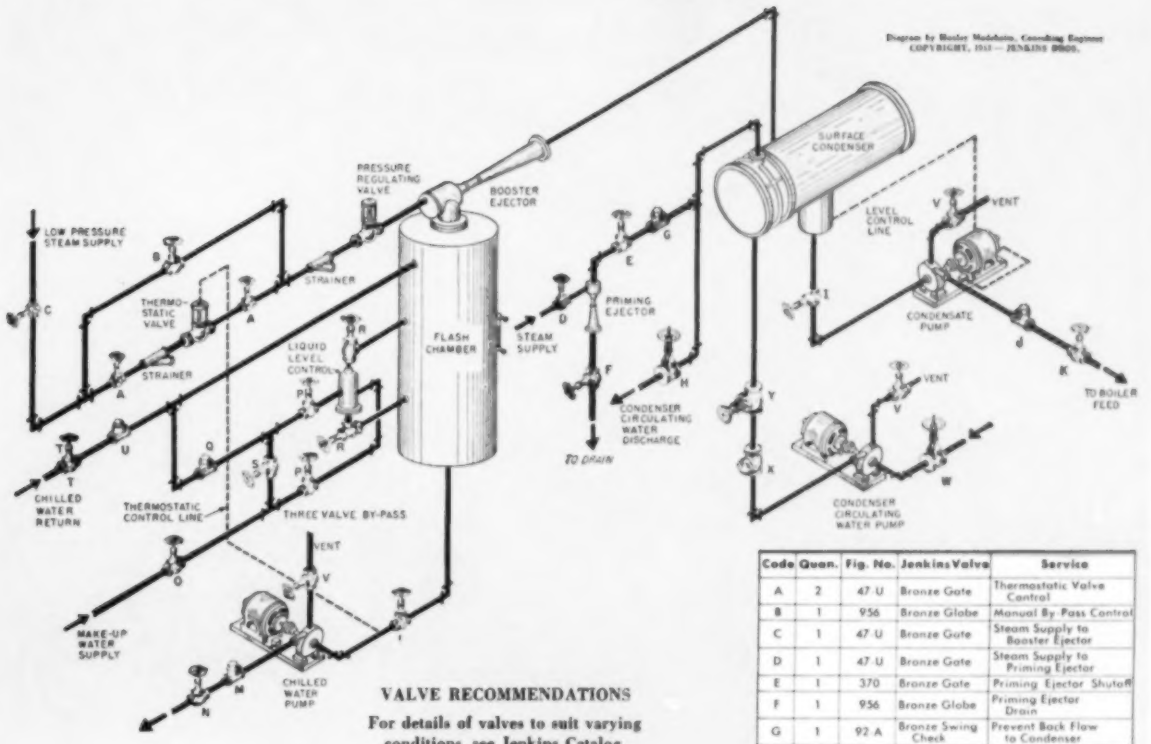


**VALVE RECOMMENDATIONS**

**For details of valves to suit varying conditions, see Jenkins Catalog.**

| Code | Quan. | Fig. No. | Jenkins Valve | Service |
|---|---|---|---|---|
| A | 2 | 47 U | Bronze Gate | Thermostatic Valve Control |
| B | 1 | 956 | Bronze Globe | Manual By-Pass Control |
| C | 1 | 47 U | Bronze Gate | Steam Supply to Booster Ejector |
| D | 1 | 47 U | Bronze Gate | Steam Supply to Priming Ejector |
| E | 1 | 370 | Bronze Gate | Priming Ejector Shutoff |
| F | 1 | 956 | Bronze Globe | Priming Ejector Drain |
| G | 1 | 92 A | Bronze Swing Check | Prevent Back Flow to Condenser |
| H | 1 | 651 A | I.B.B.M. Gate | Cooling Water Discharge Shutoff |
| I | 1 | 370 | Bronze Gate | Condensate Pump Shutdown |
| J | 1 | 92 A | Bronze Swing Check | Prevent Backflow through Condensate Pump |
| K | 1 | 106 A | Bronze Globe | Condensate Pump Control |
| L | 1 | 370 | Bronze Gate | Chilled Water Pump Shutdown |
| M | 1 | 92 A | Bronze Swing Check | Prevent Back Flow Through Pump |
| N | 1 | 106 A | Bronze Globe | Chilled Water Pump Control |
| O | 1 | 106 A | Bronze Globe | Make-up Water Control |
| P | 2 | 370 | Bronze Gate | Automatic Valve By-Pass |
| Q | 1 | 92 A | Bronze Swing Check | Prevent Backflow from Chamber |
| R | 2 | 108 A | Bronze Angle | Level Control Shutoff |
| S | 1 | 106 A | Bronze Globe | Manual By-Pass Control |
| T | 1 | 106 A | Bronze Globe | Chilled Water Control |
| U | 1 | 92 A | Bronze Swing Check | Prevent Backflow Chilled Water Lines |
| V | 1 | 106 A | Bronze Globe | Pump Vent |
| W | 1 | 651 A | I.B.B.M. Gate | Condensing Water Pump Shutdown |
| X | 1 | 624 | I.B.B.M. Swing Check | Prevent Backflow to Pump |
| Y | 1 | 613 | I.B.B.M. Globe | Pump Control |

*How to plan a*

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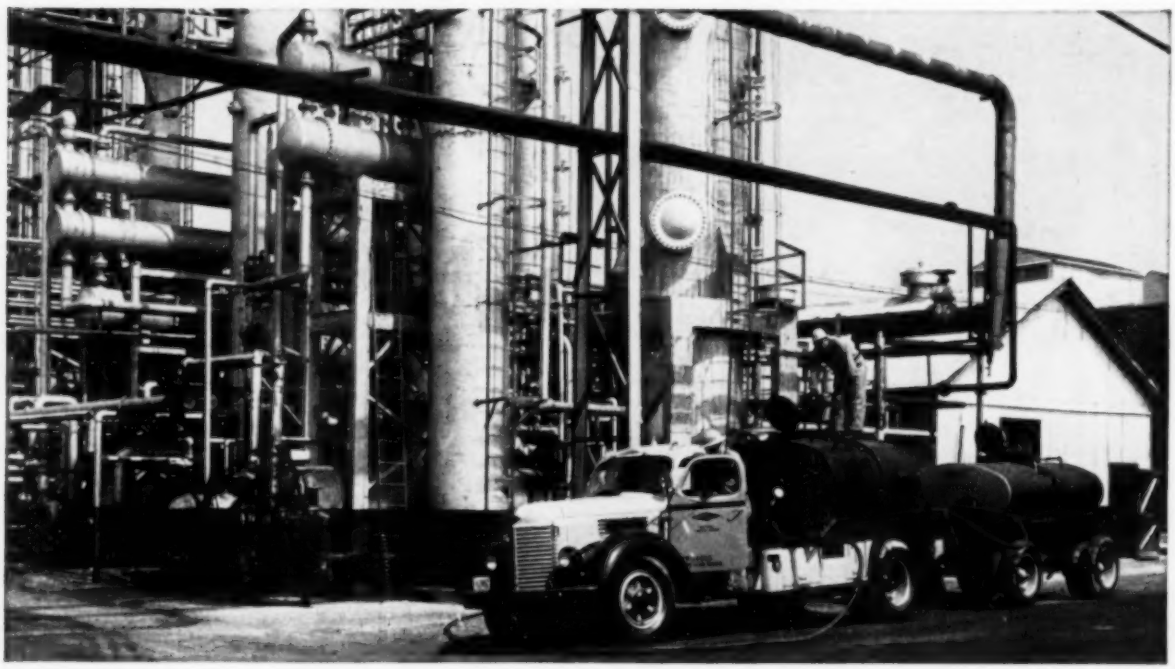

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